NASA SP-7039 (42)
January 1993

NASA PATENT ABSTRACTS BIBLIOGRAPHY

A CONTINUING BIBLIOGRAPHY
SECTION 1 ABSTRACTS

NASA STI PROGRAM
SCIENTIFIC & TECHNICAL INFORMATION

ACCESSION NUMBER RANGES

Bibliography Number	*STAR Accession Numbers*
NASA SP-7039(04) SEC 1	N69-20701 - N73-33931
NASA SP-7039(12) SEC 1	N74-10001 - N77-34042
NASA SP-7039(13) SEC 1	N78-10001 - N78-22018
NASA SP-7039(14) SEC 1	N78-22019 - N78-34034
NASA SP-7039(15) SEC 1	N79-10001 - N79-21993
NASA SP-7039(16) SEC 1	N79-21994 - N79-34158
NASA SP-7039(17) SEC 1	N80-10001 - N80-22254
NASA SP-7039(18) SEC 1	N80-22255 - N80-34339
NASA SP-7039(19) SEC 1	N81-10001 - N81-21997
NASA SP-7039(20) SEC 1	N81-21998 - N81-34139
NASA SP-7039(21) SEC 1	N82-10001 - N82-22140
NASA SP-7039(22) SEC 1	N82-22141 - N82-34341
NASA SP-7039(23) SEC 1	N83-10001 - N83-23266
NASA SP-7039(24) SEC 1	N83-23267 - N83-37053
NASA SP-7039(25) SEC 1	N84-10001 - N84-22526
NASA SP-7039(26) SEC 1	N84-22527 - N84-35284
NASA SP-7039(27) SEC 1	N85-10001 - N85-22341
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NASA SP-7039(33) SEC 1	N88-10001 - N88-20253
NASA SP-7039(34) SEC 1	N88-20254 - N88-30583
NASA SP-7039(35) SEC 1	N89-10001 - N89-20085
NASA SP-7039(36) SEC 1	N89-20086 - N89-30155
NASA SP-7039(37) SEC 1	N90-10001 - N90-20043
NASA SP-7039(38) SEC 1	N90-20044 - N90-30170
NASA SP-7039(39) SEC 1	N91-10001 - N91-21058
NASA SP-7039(40) SEC 1	N91-21059 - N91-33053
NASA SP-7039(41) SEC 1	N92-10001 - N92-22095
NASA SP-7039(41) SEC 1	N92-10001 - N92-22095
NASA SP-7039(42) SEC 1	N92-22096 - N92-34247

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NASA SP-7039 (42)
January 1993

NASA PATENT ABSTRACTS BIBLIOGRAPHY

A CONTINUING BIBLIOGRAPHY
SECTION 1 ABSTRACTS

National Aeronautics and Space Administration
Scientific and Technical Information Program
Washington, DC 1993

This supplement is available from the NASA Center for AeroSpace Information, Baltimore, MD 21240-0757, price code A05.

INTRODUCTION

Several thousand inventions result each year from the aeronautical and space research supported by the National Aeronautics and Space Administration. The inventions having important use in government programs or significant commercial potential are usually patented by NASA. These inventions cover practically all fields of technology and include many that have useful and valuable commercial application.

NASA inventions best serve the interests of the United States when their benefits are available to the public. In many instances, the granting of nonexclusive or exclusive licenses for the practice of these inventions may assist in the accomplishment of this objective. This bibliography is published as a service to companies, firms, and individuals seeking new, licensable products for the commercial market.

The *NASA Patent Abstracts Bibliography (NASA PAB)* is a semiannual NASA publication containing comprehensive abstracts and indexes of NASA-owned inventions covered by U.S. patents and applications for patent. The citations included in *NASA PAB* were originally published in NASA's *Scientific and Technical Aerospace Reports (STAR)* and cover *STAR* announcements made since May 1969.

For the convenience of the user, each issue of *NASA PAB* has a separately bound Abstract Section (Section 1) and Index Section (Section 2). Although each Abstract Section covers only the indicated six-month period, the Index Section is cumulative covering all NASA-owned inventions announced in *STAR* since 1969. Thus a complete set of *NASA PAB* would consist of the Abstract Sections of Issue 04 (January 1974) and Issue 12 (January 1978) and the Abstract Section for all subsequent issues and the Index Section for the most recent issue.

The 174 citations published in this issue of the Abstract Section cover the period July 1992 through December 1992. The Index Section references over 5300 citations covering the period May 1969 through December 1992.

ABSTRACT SECTION (SECTION 1)

This *PAB* issue includes 10 major subject divisions separated into 76 specific categories and one general category/division. (See Table of Contents for the scope note of each category, under which are grouped appropriate NASA inventions.) This scheme was devised in 1975 and revised in 1987 in lieu of the 34 category divisions which were utilized in *PAB* supplements (01) through (06) covering *STAR* abstracts from May 1969 through January 1974. Each entry in the Abstract Section consists of a *STAR* citation accompanied by an abstract and, when appropriate, a key illustration taken from the patent or application for patent. Entries are arranged by subject category in order of the ascending NASA Accession Number originally assigned for *STAR* to the invention. The range of NASA Accession Numbers within each issue is printed on the inside front cover.

Abstract Citation Data Elements: Each of the abstract citations has several data elements useful for identification and indexing purposes, as follows:

NASA Accession Number
NASA Case Number
Inventor's Name
Title of Invention
U.S. Patent Application Serial Number
U.S. Patent Number (for issued patents only)
U.S. Patent Office Classification Number(s)
(for issued patents only)

These data elements are identified in the Typical Citation and Abstract and in the indexes.

INDEX SECTION (SECTION 2)

The Index Section is divided into five indexes. These indexes are cross-indexed and are used to locate a single invention or groups of inventions.

Subject Index: Lists all inventions according to appropriate alphabetized technical term and indicates the related NASA Case Number, the Subject Category Number, and the Accession Number.

Inventor Index: Lists all inventions according to alphabetized names of inventors and indicates the related NASA Case Number, the Subject Category Number, and the Accession Number.

Source Index: Lists all inventions according to alphabetized source of invention (i.e., name of contractor or government installation where invention was made) and indicates the related NASA Case Number, the Subject Category Number, and the Accession Number.

Number Index: Lists inventions in order of ascending (1) NASA Case Number, (2) U.S. Patent Application Serial Number, (3) U.S. Patent Classification Number, and (4) U.S. Patent Number and indicates the related Subject Category Number and the Accession Number.

Accession Number Index: Lists all inventions in order of ascending Accession Number and indicates the related Subject Category Number, the NASA Case Number, the U.S. Patent Application Serial Number, the U.S. Patent Classification Number, and the U.S. Patent Number.

HOW TO USE THIS PUBLICATION TO IDENTIFY NASA INVENTIONS

To identify one or more NASA inventions within a specific technical field or subject, several techniques are possible with the flexibility incorporated into the *NASA PAB*.

(1) *Using Subject Category:* To identify all NASA inventions in any one of the subject categories in this issue of *NASA PAB*, select the desired Subject Category in the Abstract Section (Section 1) and find the inventions abstracted thereunder.

(2) *Using Subject Index:* To identify all NASA inventions listed under a desired technical subject index term, (A) turn to the cumulative Subject Index in the Index Section and find the invention(s) listed under the desired technical subject term. (B) Note the indicated Accession Number and the Subject Category Number. (C) Using the indicated Accession Number, turn to the inside front cover of the Index Section to determine which issue of the Abstract Section includes the Accession Number desired. (D) To find the abstract of the particular invention in the issue of the Abstract Section selected, (1) use the Subject Category Number to locate the Subject Category and (2) use the Accession Number to locate the desired invention within the Subject Category listing.

(3) *Using Patent Classification Index:* To identify all inventions covered by issued NASA patents (not including applications for patent) within a desired Patent Classification, (A) turn to the Patent Classification Number in the Number Index of Section 2 and find the associated invention(s), and (B) follow the instructions outlined in (2)(B), and (D) above.

TYPICAL CITATION AND ABSTRACT

NASA SPONSORED

ACCESSION NUMBER → **N92-29130*** National Aeronautics and Space Administration. ← CORPORATE SOURCE
Pasadena Office, CA.

TITLE → **PRECISION MEASUREMENT OF MAGNETIC CHARACTERISTICS OF AN ARTICLE WITH NULLIFICATION OF EXTERNAL MAGNETIC FIELDS Patent**

INVENTORS → SHAWN B. HONESS, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.), PABLO NARVAEZ, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.), and JAMES M. MCAULEY, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 30 Jun. 1992 14 p Filed 27 Nov. 1990

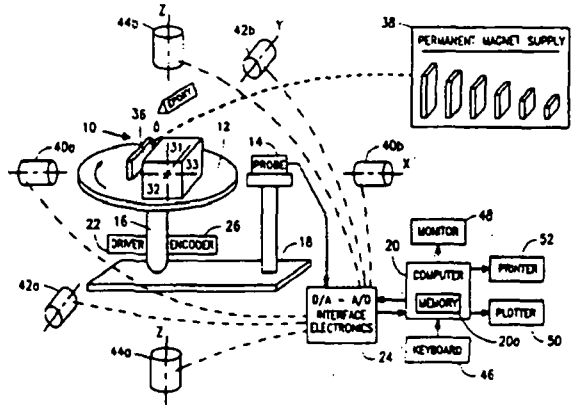
NASA CASE NUMBER → (NASA-CASE-NPO-18187-1-CU; US-PATENT-5,126,669; US-PATENT-APPL-SN-618789; US-PATENT-CLASS-324-261; US-PATENT-CLASS-324-244; US-PATENT-CLASS-324-205; US-PATENT-CLASS-361-148; US-PATENT-CLASS-361-149; US-PATENT-CLASS-361-267; INT-PATENT-CLASS-G01N-27/72) Avail:

US PATENT APPLICATIONS SERIAL NUMBERS →

AVAILABILITY SOURCE → US Patent and Trademark Office

An apparatus for characterizing the magnetic field of a device under test is discussed. The apparatus is comprised of five separate devices: (1) a device for nullifying the ambient magnetic fields in a test environment area with a constant applied magnetic field; (2) a device for rotating the device under test in the test environment area; (3) a device for sensing the magnetic field (to obtain a profile of the magnetic field) at a sensor location which is along the circumference of rotation; (4) a memory for storing the profiles; and (5) a processor coupled to the memory for characterizing the magnetic field of the device from the magnetic field profiles thus obtained. Official Gazette of the U.S. Patent and Trademark Office

ABSTRACT ←



KEY ILLUSTRATION ←

TABLE OF CONTENTS

Section 1 • Abstracts

N.A.—no abstracts were assigned to this category for this issue.

CHEMISTRY AND MATERIALS

ENGINEERING For related information see also *Physics.*

GEOSCIENCES For related information see also *Space Sciences.*

LIFE SCIENCES

MATHEMATICAL AND COMPUTER SCIENCES

PHYSICS For related information see also *Engineering.*

SOCIAL SCIENCES

SPACE SCIENCES For related information see also *Geosciences.*

GENERAL

Includes aeronautical, astronautical, and space science related histories, biographies, and pertinent reports too broad for categorization; histories or broad overviews of NASA programs.

Section 2 • Indexes

JANUARY 1993 (Supplement 42)

NASA Patent Abstracts Bibliography

A Semiannual Publication of the National Aeronautics and Space Administration

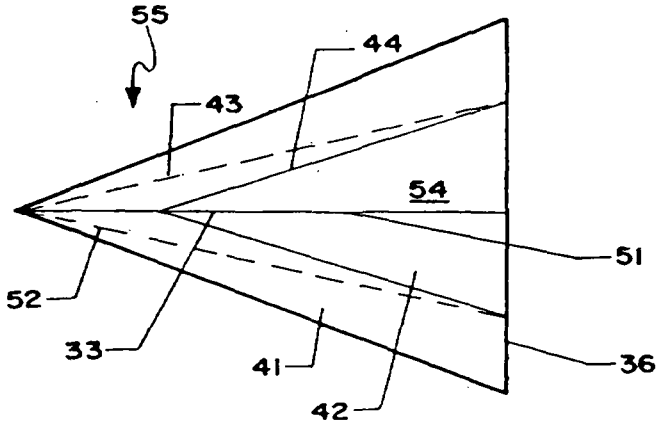
02
AERODYNAMICS

Includes aerodynamics of bodies, combinations, wings, rotors, and control surfaces; and internal flow in ducts and turbomachinery.

N92-28729* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
NATURAL FLOW WING Patent
RICHARD M. WOOD, inventor (to NASA) and STEVEN X. S. BAUER, inventor (to NASA) 12 May 1992 13 p Filed 31 Jul. 1990(NASA-CASE-LAR-14281-1; US-PATENT-5,112,120; US-PATENT-APPL-SN-560923; US-PATENT-CLASS-244-35R; US-PATENT-CLASS-244-36; INT-PATENT-CLASS-B64C-3/14) Avail: US Patent and Trademark Office

The invention is a natural flow wing and a method for constructing the same. The method comprises contouring a three-dimensional upper surface and a three-dimensional lower surface of the natural flow wing independently of one another into a prescribed shape. Experimental data and theoretical analysis show that flow and pressure-loading over an upper surface of a wing tend to be conical about an apex of the wing, producing favorable and unfavorable regions of performance based on drag. The method reduces these unfavorable regions by shaping the upper surface such that the maximum thickness near a tip of the natural flow wing moves aft, thereby, contouring the wing to coincide more closely with the conical nature of the flow on the upper surface. Nearly constant compressive loading characterizes the flow field over a lower surface of the conventional wing. Magnitude of these compressive pressures on the lower surface depends on angle of attack and on a streamwise curvature of the lower surface of the wing and not on a cross-sectional spanwise curvature. The method, thereby, shapes the lower surface to create an area as large as possible with negative slopes. Any type of swept wing may be used to obtain the final, shaped geometry of the upper and lower surfaces of the natural flow wing.

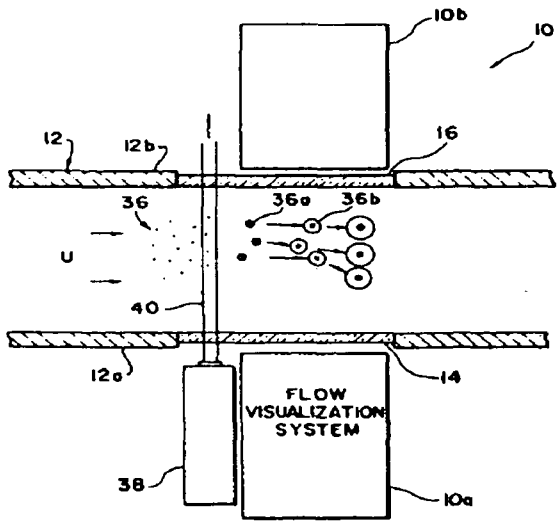
Official Gazette of the U.S. Patent and Trademark Office



N92-34172* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
VAPORIZING PARTICLE VELOCIMETER Patent
LEONARD M. WEINSTEIN, inventor (to NASA) 6 Oct. 1992 6 p Filed 14 Jun. 1991 Supersedes N91-28135 (29 - 20, p 3280) (NASA-CASE-LAR-14685-1; US-PATENT-5,153,665; US-PATENT-APPL-SN-718313; US-PATENT-CLASS-356-28; US-PATENT-CLASS-73-861.05; US-PATENT-CLASS-356-318; INT-PATENT-CLASS-G01P-3/36) Avail: US Patent and Trademark Office

A velocimeter measures flow characteristics of a flow traveling through a chamber in a given direction. Tracer particles are entrained in the flow and a source of radiant energy produces an output stream directed transversely to the chamber, having a sufficient intensity to vaporize the particles as they pass through the output stream. Each of the vaporized particles explodes to produce a shock wave and a hot core, and a flow visualization system tracks the motion of the hot cores and shock waves to measure the velocity of each tracer particle and the temperature of the flow around the tracer.

Official Gazette of the U.S. Patent and Trademark Office

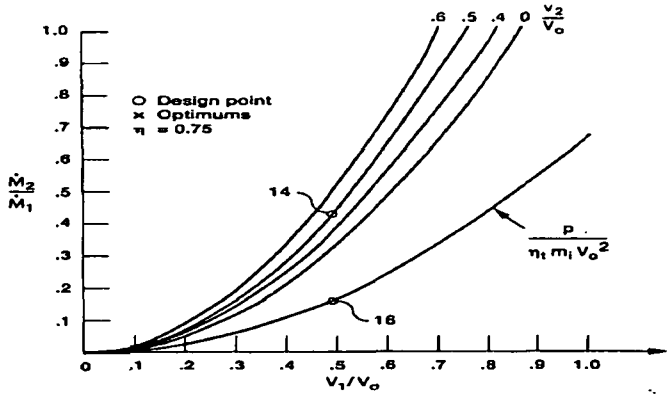


N92-34243*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
METHOD OF REDUCING DRAG IN AERODYNAMIC SYSTEMS Patent Application
FRANK HRACH, inventor (to NASA) 11 Sep. 1992 10 p (NASA-CASE-LEW-14791-1; NAS 1.71:LEW-14791-1; US-PATENT-APPL-SN-943659) Avail: CASI HC A02/MF A01

In the present method, boundary layer thickening is combined with laminar flow control to reduce drag. An aerodynamic body is accelerated enabling a ram turbine on the body to receive air at velocity V sub 0. The discharge air is directed over an aft portion of the aerodynamic body producing boundary layer thickening. The ram turbine also drives a compressor by applying torque to a shaft connected between the ram turbine and the compressor. The com-

pressor sucks in lower boundary layer air through inlets in the shell of the aircraft producing laminar flow control and reducing drag. The discharge from the compressor is expanded in a nozzle to produce thrust.

NASA



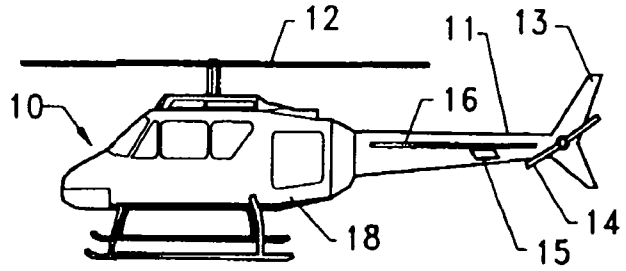
08
AIRCRAFT STABILITY AND CONTROL

Includes aircraft handling qualities; piloting; flight controls; and autopilots.

N92-30025*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
HELICOPTER LOW-SPEED YAW CONTROL Patent Application
JOHN C. WILSON, inventor (to NASA), HENRY L. KELLEY, inventor (to NASA), and CYNTHIA A. CROWELL, inventor (to NASA) (Army Aerostructures Directorate, Hampton, VA.) 7 Nov. 1991 10 p (NASA-CASE-LAR-14219-1; NAS 1.71:LAR-14219-1; US-PATENT-APPL-SN-788908) Avail: CASI HC A02/MF A01

A system for improving yaw control at low speeds consists of one strake placed on the upper portion of the fuselage facing the retreating rotor blade and another strake placed on the lower portion of the fuselage facing the advancing rotor blade. These strakes spoil the airflow on the helicopter tail boom during hover, low speed flight, and right or left sidewards flight so that less sidethrust is required from the tail rotor.

NASA



09
RESEARCH AND SUPPORT FACILITIES (AIR)

Includes airports, hangars and runways; aircraft repair and overhaulfacilities; wind tunnels; shock tubes; and aircraft engine test stands.

N92-34213*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
PILOT-PRESSURE PROBE FOR MEASURING PRESSURE IN A HYPERSONIC WIND TUNNEL Patent Application
GEORGE C. ASHBY, JR., inventor (to NASA) 16 Jul. 1992 11 p (NASA-CASE-LAR-14232-1; NAS 1.71:LAR-14232-1; US PATENT-APPL-SN-914905) Avail: CASI HC A03/MF A01

A device for measuring pressure in high-velocity fluid streams in wind tunnels in which a transducer is mounted within a housing located within the wind tunnel and separated by a relatively short distance from a pitot tube in the free stream area of the wind tunnel is presented. Because the tunnel must be heated to a very high temperature, the transducer is water cooled. Additionally, the construction of this pressure probe is such that the pitot tube may move rotationally or radially relative to the transducer housing.

NASA

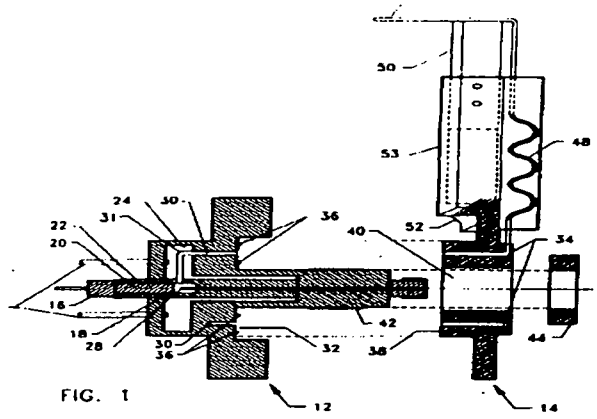


FIG. 1

18
SPACECRAFT DESIGN, TESTING AND PERFORMANCE

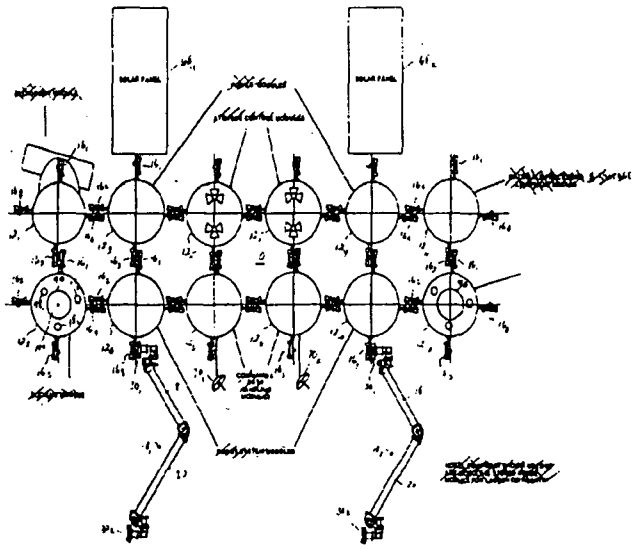
Includes satellites; space platforms; space stations; spacecraft systems and components such as thermal and environmental controls; and attitude controls.

N92-24244*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
ROBOT SERVICED SPACE FACILITY Patent Application
LLOYD R. PURVES, inventor (to NASA) 23 Oct. 1991 47 p (NASA-CASE-GSC-13408-1; NAS 1.71:GSC-13408-1; US-PATENT-APPL-SN-781625) Avail: CASI HC A03/MF A01

A robot serviced space facility includes multiple modules which are identical in physical structure, but selectively differing in function and purpose. Each module includes multiple like attachment points which are identically placed on each module so as to permit interconnection with immediately adjacent modules. Connection is made through like outwardly extending flange assemblies having identical male and female configurations for interconnecting to and locking to a complementary side of another flange. Multiple rows of intercon-

nected modules permit force, fluid, data and power transfer to be accomplished by redundant circuit paths. Redundant modules of critical subsystems are included. Redundancy of modules and of interconnections results in a space complex with any module being removable upon demand, either for module replacement or facility reconfiguration, without eliminating any vital functions of the complex. Module replacement and facility assembly or reconfiguration are accomplished by a computer controlled articulated walker type robotic manipulator arm assembly having two identical end effectors in the form of male configurations which are identical to those on module flanges and which interconnect to female configurations on other flanges. The robotic arm assembly moves along a connected set of modules by successively disconnecting, moving and reconnecting alternate ends of itself to a succession of flanges in a walking type maneuver. To transport a module, the robot keeps the transported module attached to one of its end effectors and uses another flange male configuration of the attached module as a substitute end effector during walking.

NASA



N92-28750* National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.

CLOSED-LOOP AUTONOMOUS DOCKING SYSTEM Patent

RICHARD W. DABNEY, inventor (to NASA) and RICHARD T. HOWARD, inventor (to NASA) 28 Apr. 1992 10 p Filed 20 Feb. 1990 Supersedes N90-26861 (28 - 21, p 2966) (NASA-CASE-MFS-28421-1; US-PATENT-5,109,345; US-PATENT-APPL-SN-481537; US-PATENT-CLASS-364-459; US-PATENT-CLASS-358-103;US-PATENT-CLASS-244-161;INT-PATENT-CLASS-B64G-1/64) Avail: US Patent and Trademark Office

An autonomous docking system is provided which produces commands for the steering and propulsion system of a chase vehicle used in the docking of that chase vehicle with a target vehicle. The docking system comprises a passive optical target affixed to the target vehicle and comprising three reflective areas including a central area mounted on a short post, and tracking sensor and process controller apparatus carried by the chase vehicle. The latter apparatus comprises a laser diode array for illuminating the target so as to cause light to be reflected from the reflective areas of the target; a sensor for detecting the light reflected from the target and for producing an electrical output signal in accordance with an image of the reflected light; a signal processor for processing the electrical output signal in accordance with an image of the reflected light; a signal processor for processing the electrical output signal and for producing, based thereon, output signals relating to the relative range, roll, pitch, yaw, azimuth, and elevation of the chase and target vehicles; and a docking process controller, responsive to the output signals produced by the signal processor, for producing command signals for controlling the steering and propulsion system of the chase vehicle.

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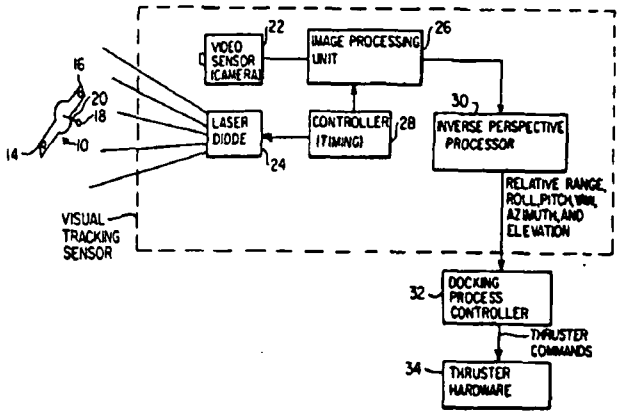


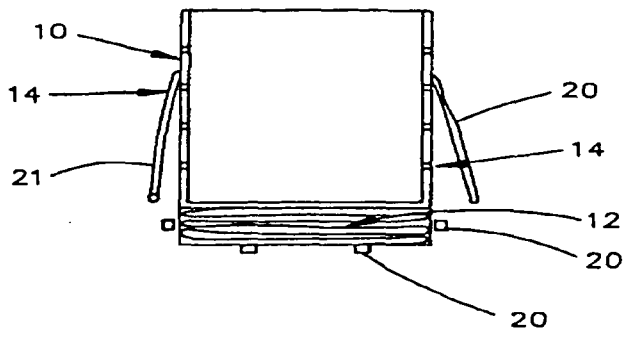
N92-30315*# *National Aeronautics and Space Administration.* Lyndon B. Johnson Space Center, Houston, TX.

SPACE STATION TRASH REMOVAL SYSTEM Patent Application

ANDREW J. PETRO, inventor (to NASA) 22 May 1992 15 p (NASA-CASE-MSC-21723-1;NAS 1.71:MSC-21723-1;US-PATENT-APPL-SN-887001) Avail: CASI HC A03/MF A01

A trash removal system for space stations is described. The system is comprised of a disposable trash bag member and an attached, compacted large, lightweight inflatable balloon element. When the trash bag member is filled, the astronaut places the bag member into space through an airlock. Once in the vacuum of space, the balloon element inflates. Due to the large cross-sectional area of the balloon element relative to its mass, the combined balloon element and the trash bag member are slowed by atmospheric drag to a much greater extent than the Space Station's. The balloon element and bag member lose altitude and re-enter the atmosphere, and the elements and contents are destroyed by aerodynamic heating. The novelty of this system is in the unique method of using the vacuum of space and aerodynamic heating to dispose of waste material with a minimum of increase in orbital debris.

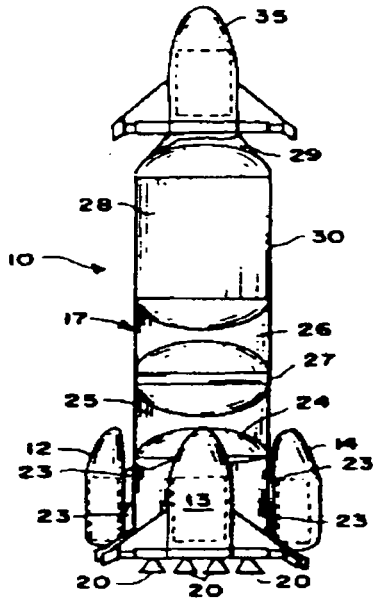
NASA



N92-33013* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
INTEGRATED LAUNCH AND EMERGENCY VEHICLE SYSTEM Patent
JAMES A. MARTIN, inventor (to NASA) 1 Sep. 1992 9 p Filed 31 Aug. 1990 Supersedes N91-13481 (29 - 5, p 628) (NASA-CASE-LAR-13780-1; US-PATENT-5,143,327; US-PATENT-APPL-SN-575737; US-PATENT-CLASS-244-158R; US-PATENT-CLASS-244-160; US-PATENT-CLASS-244-172; INT-PATENT-CLASS-B64G-1/40) Avail: US Patent and Trademark Office

A heavy launch vehicle is discussed. The launch vehicle is comprised of an expendable, multi-container, propellant tank that has a plurality of winged booster propulsion modules at one end and a payload supported by adapter structure at the other end. The preferred payload is an entry module that can be adapted for docking to the space station and used as a return vehicle for the space station crew. Additionally, the payload may include communication satellites, supplies, equipment, and/or structural elements for the space station. The winged propulsion modules are released from the expendable propellant tank, in pairs, and they return to Earth in a controlled glide. After a safe landing, at or near the launch site, the modules are prepared for reuse. The rocket engines for each propulsion module are dual-fuel, dual-mode engines and use methane-oxygen and hydrogen-oxygen from the multi-containers of the propellant tank. When the propulsion modules are released from the expendable propellant tank, the rocket engines are moved into the module cargo bay for the return glide flight.

Official Gazette of the U.S. Patent and Trademark Office



23
CHEMISTRY AND MATERIALS (GENERAL)

N92-29141* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
POLY(1,3,4-OXADIAZOLES) VIA AROMATIC NUCLEOPHILIC DISPLACEMENT Patent
JOHN W. CONNELL, inventor (to NASA), PAUL M. HERGENROTHER, inventor (to NASA), and PETER WOLF, inventor (to NASA) 2 Jun. 1992 9 p Filed 22 Jan. 1991 Supersedes N91-23237 (29 - 15, p 2391) (NASA-CASE-LAR-14427-1; US-PATENT-5,118,781; US-PATENT-APPL-SN-645089; US-PATENT-CLASS-528-185; US-PATENT-CLASS-548-143; INT-PATENT-CLASS-C08G-7308; INT-PATENT-CLASS-C07D-271/10) Avail: US Patent and Trademark Office

Poly (1,3,4-oxadiazoles) (POX) are prepared by the aromatic nucleophilic displacement reaction of di(hydroxyphenyl) 1,3,4-oxadiazole monomers with activated aromatic dihalides or activated aromatic dinitro compounds. The polymerizations are carried out in polar aprotic solvents such as sulfolane or diphenylsulfone using alkali metal bases such as potassium carbonate at elevated temperatures under nitrogen. The di(hydroxyphenyl) 1,3,4-oxadiazole monomers are synthesized by reacting 4-hydroxybenzoic hydrazide with phenyl 4-hydrobenzoate in the melt and also by reacting aromatic dihydrazides with two moles of phenyl 4-hydroxybenzoate in the melt. This synthetic route has provided high molecular weight POX of new chemical structure, is economically and synthetically more favorable than other routes, and allows for facile chemical structure variation due to the large variety of activated aromatic dihalides which are available.

Official Gazette of the U.S. Patent and Trademark Office

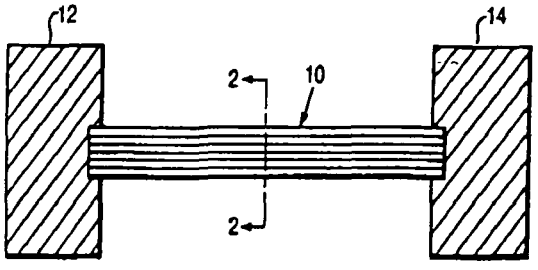
24
COMPOSITE MATERIALS

Includes physical, chemical, and mechanical properties of laminates and other composite materials.

N92-34208*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
HEAT TRANSFER DEVICE Patent Application
BRUCE A. BANKS, inventor (to NASA) and JAMES R. GAIER, inventor (to NASA) 11 May 1992 11 p (NASA-CASE-LEW-14162-3; NAS 1.71:LEW-14162-3; US-PATENT-APPL-SN-880851)
Avail: CASI HC A03/MF A01

Gas derived graphite fibers generated by the decomposition of an organic gas are joined with a suitable binder. This produces a high thermal conductivity composite material which passively conducts heat from a source, such as a semiconductor, to a heat sink. The fibers may be intercalated. The intercalate can be halogen or halide salt, alkaline metal, or any other species which contributes to the electrical conductivity improvement of the graphite fiber. The fibers are bundled and joined with a suitable binder to form a high thermal conductivity composite material device. The heat transfer device may also be made of intercalated highly oriented pyrolytic graphite and machined, rather than made of fibers.

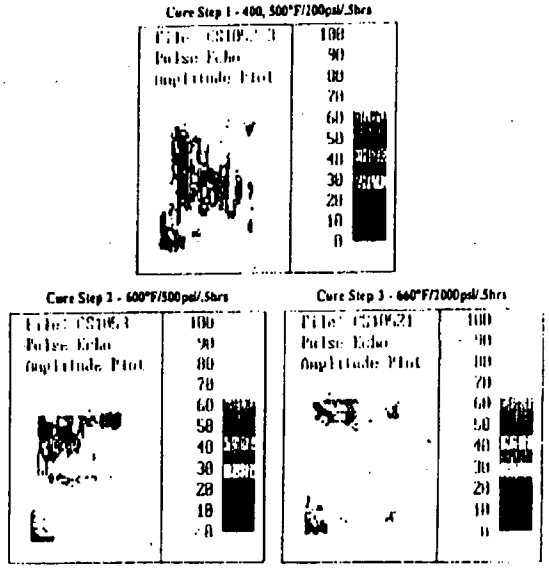
NASA



N92-34214*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
LOW PRESSURE PROCESS FOR CONTINUOUS FIBER REINFORCED POLYAMIC ACID RESIN MATRIX COMPOSITE LAMINATES Patent Application
TAN-HUNG HOU, inventor (to NASA) (Lockheed Engineering and Sciences Co., Hampton, VA.), PAUL W. KIDDER, inventor (to NASA) (Lockheed Engineering and Sciences Co., Hampton, VA.), ROBERT M. BAUCOM, inventor (to NASA), and RAKASI M. REDDY, inventor (to NASA) (Old Dominion Univ., Norfolk, VA.) 30 Jul. 1992 16 p
(Contract NAS1-19000; NAG1-569)
(NASA-CASE-LAR-14954-1; NAS 1.71:LAR-14954-1; US-PATENT-APPL-SN-924689) Avail: CASI HC A03/MF A01

A low pressure processor was developed for preparing a well-consolidated polyimide composite laminate. Prepreg plies were formed from unidirectional fibers and a polyamic acid resin solution. Molding stops were placed at the sides of a matched metal die mold. The prepreg plies were cut shorter than the length of the mold in the in-plane lateral direction and were stacked between the molding stops to a height which was higher than the molding stops. The plies were then compressed to the height of the stops and heated to allow the volatiles to escape and to start the imidization reaction. After removing the stops from the mold, the heat was increased and 0 - 500 psi was applied to complete the imidization reaction. The heat and pressure were further increased to form a consolidated polyimide composite laminate.

NASA



25
INORGANIC AND PHYSICAL CHEMISTRY

Includes chemical analysis, e.g., chromatography; combustion theory; electrochemistry; and photochemistry.

N92-25399*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.
METAL ETCHING COMPOSITION Patent
JOSEPH E. OTOUSA, inventor (to NASA), CLARK S. THOMAS, inventor (to NASA), and ROBERT E. FOSTER, inventor (to NASA) 23 Jul. 1991 3 p Filed 25 Sep. 1990
(NASA-CASE-MFS-29576-1; US-PATENT-5,034,093; US-PATENT-APPL-SN-587890; US-PATENT-CLASS-156-664; US-PATENT-CLASS-156-656; US-PATENT-CLASS-252-79.2; US-PATENT-CLASS-252-79.4; INT-PATENT-CLASS-B44C-1/22; INT-PATENT-CLASS-C23F-1/00; INT-PATENT-CLASS-C09K-13/00) Avail: US Patent and Trademark Office

The present invention is directed to a chemical etching composition for etching metals or metallic alloys. The composition includes a solution of hydrochloric acid, phosphoric acid, ethylene glycol, and an oxidizing agent. The etching composition is particularly useful for etching metal surfaces in preparation for subsequent fluorescent penetrant inspection.

Official Gazette of the U.S. Patent and Trademark Office

N92-28728* National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.
CONTROLLED METHOD OF REDUCING ELECTROPHORETIC MOBILITY OF MACROMOLECULES, PARTICLES, OR CELLS Patent
JAMES M. VANALSTINE, inventor (to NASA) 28 Apr. 1992 11 p Filed 18 Oct. 1990 Continuation-in-part of US-Patent-Appl-SN-376487, filed 7 Jul. 1989 (NASA-CASE-MFS-26049-2-NP; US-PATENT-5,108,568; US-PATENT-APPL-SN-599601; US-PATENT-APPL-SN-376487; US-PATENT-CLASS-204-180.1; US-PATENT-CLASS-204-183.3; US-PATENT-CLASS-204-299R; INT-PATENT-CLASS-G01N-27/26) Avail: US Patent and Trademark Office

A method of reducing electrophoretic mobility of macromolecules, particles, cells, and other substances is provided which comprises interacting in a conventional electrophoretic separating procedure, the substances with a polymer-linked affinity compound comprised of a hydrophilic neutral polymer such as polyethylene glycol bound to a second component such as a hydrophobic compound, an immunocompound such as an antibody or antibody active fragment, or a ligand such as a hormone, drug, antigen, or a hapten. The reduction of electrophoretic mobility achieved is directly proportional to the concentration of the polymer-linked affinity compound employed, and such reduction can comprise up to 100 percent for particular particles and cells. The present invention is advantageous in that electrophoretic separation can now be achieved for substances whose native surface charge structure had prevented them from being separated by normal electrophoretic means. Depending on the affinity component utilized, separation can be achieved on the basis of the specific/irreversible, specific/reversible, semi-specific/reversible, relatively nonspecific/reversible, or relatively nonspecific/irreversible ligand-substance interactions.

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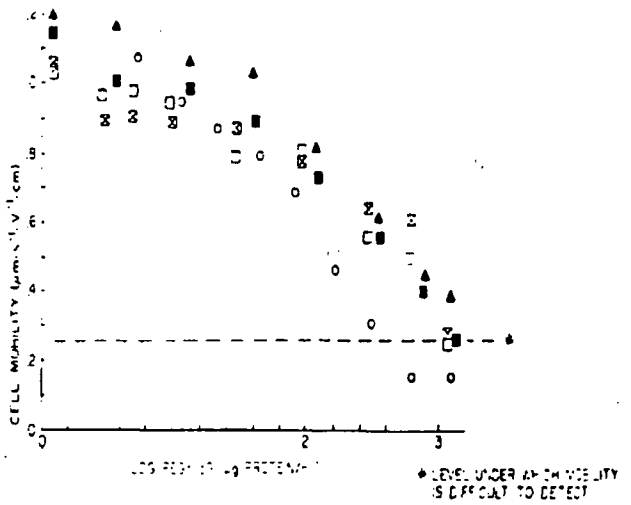

N92-28756* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
WATER ELECTROLYSIS Patent
FRANZ H. SCHUBERT, inventor (to NASA) and DAVID J. GRIGGER, inventor (to NASA) 5 May 1992 5 p Filed 1 Feb. 1991 (NASA-CASE-MSC-21572-1-SB; US-PATENT-5,110,436; US-PATENT-APPL-SN-648933; US-PATENT-CLASS-204-129; INT-PATENT-CLASS-C25B-1/04; INT-PATENT-CLASS-C25B-1/12) Avail: US Patent and Trademark Office

This disclosure is directed to an electrolysis cell forming hydrogen and oxygen at space terminals. The anode terminal is porous and able to form oxygen within the cell and permit escape of the gaseous oxygen through the anode and out through a flow line in the presence of backpressure. Hydrogen is liberated in the cell at the opposing solid metal cathode which is permeable to hydrogen but not oxygen so that the migratory hydrogen formed in the cell is able to escape from the cell. The cell is maintained at an elevated pressure so that the oxygen liberated by the cell is delivered at elevated pressure without pumping to raise the pressure of the oxygen.

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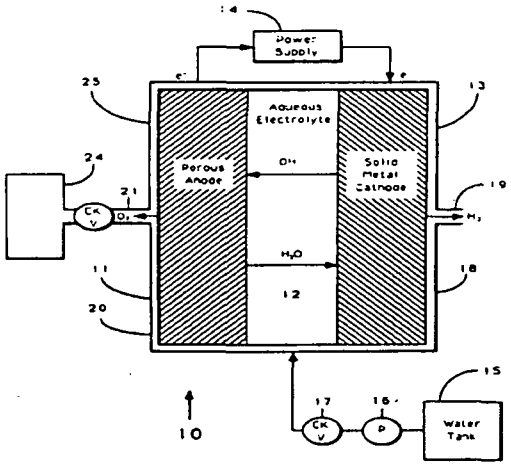
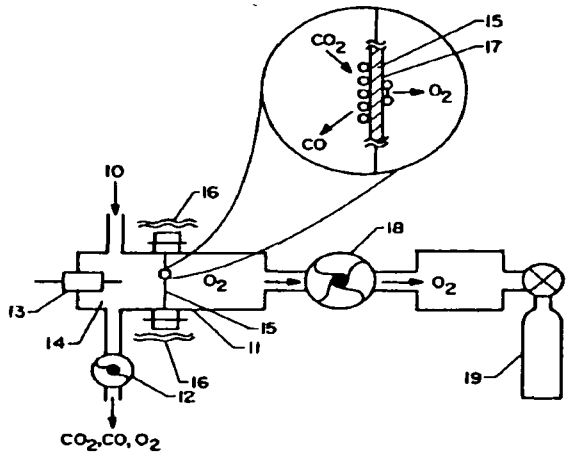


N92-30098*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
CONVERTING A CO2 ATMOSPHERE TO A HIGH-PURITY O2 SUPPLY Patent Application
RONALD A. OUTLAW, inventor (to NASA) 29 Jul. 1991 9 p (NASA-CASE-LAR-14398-1; NAS 1.71:LAR-14398-1; US-PATENT-APPL-SN-736985) Avail: CASI HC A02/MF A01

A CO2 atmosphere or any other oxygen bearing gas is converted to a high-purity O2 supply by in-letting a flow of CO2 from the atmosphere into a closed container, which is equipped with a means for creating a glow discharge or other method for dissociation in proximity to a permeable silver membrane kept at a temperature between about 400 and 800 C. A glow discharge is created to dissociate the CO2 to form a partial pressure of atomic and molecular oxygen. The oxygen produced is allowed to absorb, dissolve as atoms, permeate the silver membrane to a vacuum interface in a downstream region thereof, where the atomic oxygen thermally recombines on the surface of the membrane to O2 and desorbs: O + O yields reversibly O2. The desorbed O2 is pumped away from the downstream region to maintain as low a concentration of O2 in the downstream region as possible. The pumped away O2 is then compressed into a storage volume to provide an adequate pressure of oxygen for functional utilization.

NASA



N92-33009* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
MICROPOROUS STRUCTURE WITH LAYERED INTERSTITIAL SURFACE TREATMENT, AND METHOD AND APPARATUS FOR PREPARATION THEREOF Patent
STEVEN L. KOONTZ, inventor (to NASA) 25 Aug. 1992 11 p Filed 31 Oct. 1989 Supersedes N90-16887 (28 - 9, p 1189) (NASA-CASE-MSC-21487-1; US-PATENT-5,141,806; US-PATENT-APPL-SN-429739; US-PATENT-CLASS-428-315.5; US-PATENT-CLASS-210-198.2; US-PATENT-CLASS-210-502.1; US-PATENT-CLASS-210-635; US-PATENT-CLASS-428-315.7; US-PATENT-CLASS-428-404; US-PATENT-CLASS-530-413) Avail: US Patent and Trademark Office

A microporous structure with layered interstitial surface treatments, and the method and apparatus for its preparation are disclosed. The structure is prepared by sequentially subjecting a uniformly surface treated structure to atomic oxygen treatment to remove an outer layer of surface treatment to a generally uniform depth, and then surface treating the so exposed layer with another surface treating agent. The atomic oxygen/surface treatment steps may optionally be repeated, each successive time to a lesser depth, to produce a microporous structure having multilayered surface treatments. The apparatus employs at least one side arm from a main oxygen-containing chamber. The side arm has characteristic relaxation times such that a uniform atomic oxygen dose rate is delivered to a specimen positioned transversely in the side arm spaced from the main gas chamber.

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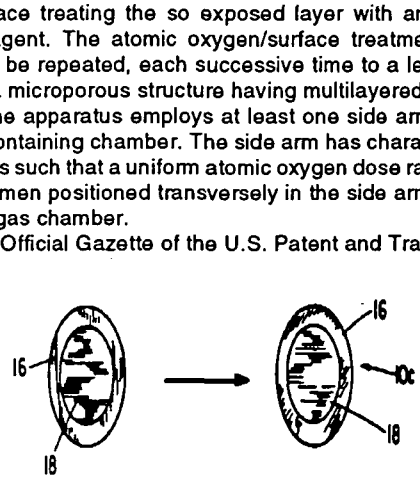

N92-33029* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
PURIFICATION SYSTEM Patent
DAVID T. FLANAGAN, inventor (to NASA) and RANDALL E. GIBBONS, inventor (to NASA) 25 Aug. 1992 6 p Filed 8 Jan. 1991 Supersedes N91-24362 (29 - 16, p 2592) (NASA-CASE-MSC-21584-1; US-PATENT-5,141,636; US-PATENT-APPL-SN-638600; US-PATENT-CLASS-210-209; US-PATENT-CLASS-210-266; US-PATENT-CLASS-210-269; US-PATENT-CLASS-210-287; US-PATENT-CLASS-210-670; US-PATENT-CLASS-210-748; US-PATENT-CLASS-210-758) Avail: US Patent and Trademark Office

A system for prolonging the life of a granulated activated charcoal (GAC) water treatment device is disclosed in which an ultraviolet light transparent material is used to constrain water to flow over carbon surfaces. It is configured to receive maximum flux from a UV radiation source for the purpose of preventing microbial proliferation on the carbon surfaces; oxidizing organic contaminants adsorbed from the water onto the carbon surfaces and from biodegradation of adsorbed microbial forms; disinfecting water; and oxidizing organic contaminants in the water.

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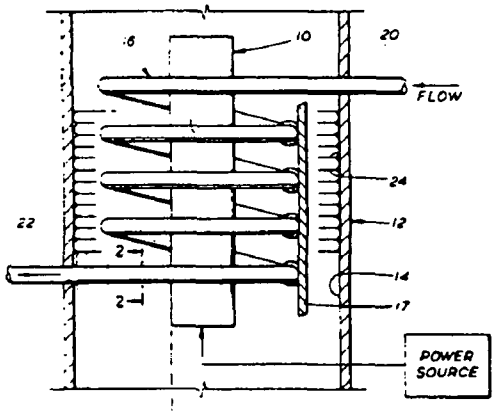

N92-33611* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
ACOUSTOPHORESIS METHOD AND APPARATUS Patent
JOSEPH S. HEYMAN, inventor (to NASA) 15 Sep. 1992 8 p Filed 17 Dec. 1990 Supersedes N91-28321 (29 - 20, p 3310) (NASA-CASE-LAR-13388-1; US-PATENT-5,147,562; US-PATENT-APPL-SN-628062; US-PATENT-CLASS-210-748; US-PATENT-CLASS-55-15; US-PATENT-CLASS-55-277; US-PATENT-CLASS-210-222; US-PATENT-CLASS-210-223; US-PATENT-CLASS-210-695; US-PATENT-CLASS-210-767) Avail: US Patent and Trademark Office

A method and apparatus are provided for acoustophoresis, i.e., the separation of species via acoustic waves. An ultrasonic transducer applies an acoustic wave to one end of a sample container containing at least two species having different acoustic absorptions. The wave has a frequency tuned to or harmonized with the point of resonance of the species to be separated. This wave caused the species to be driven to an opposite end of the sample container for removal. A second ultrasonic transducer may be provided to apply a second, oppositely directed acoustic wave to prevent undesired streaming. In addition, a radio frequency tuned to the mechanical resonance and coupled with a magnetic field can serve to identify a species in a medium comprising species with similar absorption coefficients, whereby an acoustic wave having a frequency corresponding to this gyrational rate can then be applied to sweep the identified species to one end of the container for removal.

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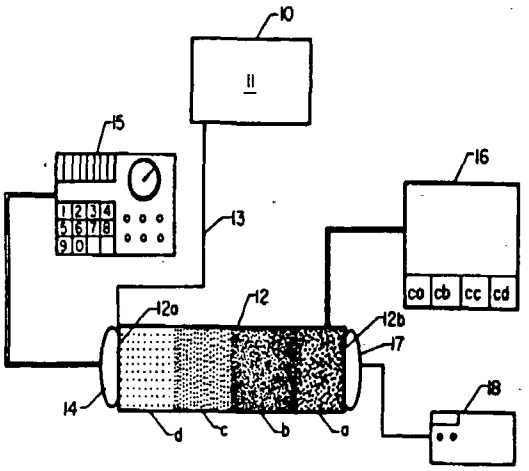
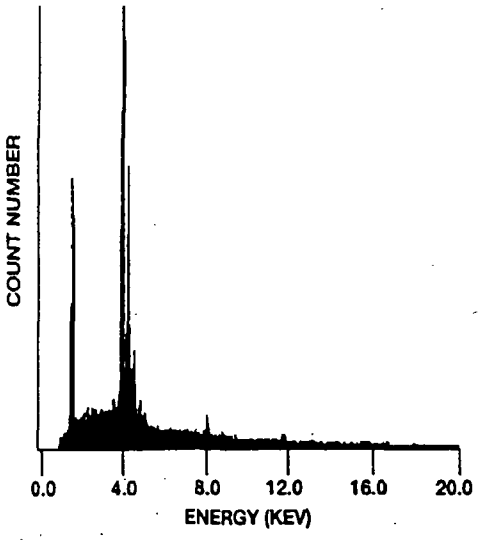


N92-34206*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
GRAPHITE FLUORIDE FROM IODINE INTERCALATED GRAPHITIZED CARBON Patent Application
CHING-CHEH HUNG, inventor (to NASA) 15 May 1992 14 p (NASA-CASE-LEW-15360-1; NAS 1.71:LEW-15360-1; US-PATENT-APPL-SN-884097) Avail: CASI HC A03/MF A01

Graphite fluoride is produced from graphitized carbon. A bromine iodine mixture reacts with graphitized carbon to produce iodine intercalated graphitized carbon that is then exposed to fluorine.

NASA



26
METALLIC MATERIALS

Includes physical, chemical, and mechanical properties of metals, e.g., corrosion; and metallurgy.

N92-29094* National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
HIGH TEMPERATURE SOLDER DEVICE FOR FLAT CABLES Patent
CARL L. HAEHNER, inventor (to NASA) 30 Jun. 1992 7 p Filed 20 Jun. 1991 Supersedes N91-283363 (29 - 20, p 3317) (NASA-CASE-GSC-13344-1; US-PATENT-5,126,527;US PATENT-APPL-SN-718046; US-PATENT-CLASS-219-85.15; US-PATENT-CLASS-219-85.19; INT-PATENT-CLASS-B23K-1/00) Avail: US Patent and Trademark Office

A high temperature solder device for flat cables includes a microwelder, an anvil which acts as a heat sink and supports a flexible flat ribbon cable that is to be connected to a multiple pin connector. The microwelder is made from a modified commercially available resistance welding machine such as the Split Tip Electrode microwelder by Weltek, which consists of two separate electrode halves with a removable dielectric spacer in between. The microwelder is not used to weld the items together, but to provide a controlled compressive force on, and energy pulse to, a solder preform placed between a pin of the connector and a conductor of the flexible flat ribbon cable. When the microwelder is operated, an electric pulse will flow down one electrode, through the solder preform and back up the other electrode. This pulse of electrical energy will cause the solder preform to heat up and melt, joining the pin and conductor.
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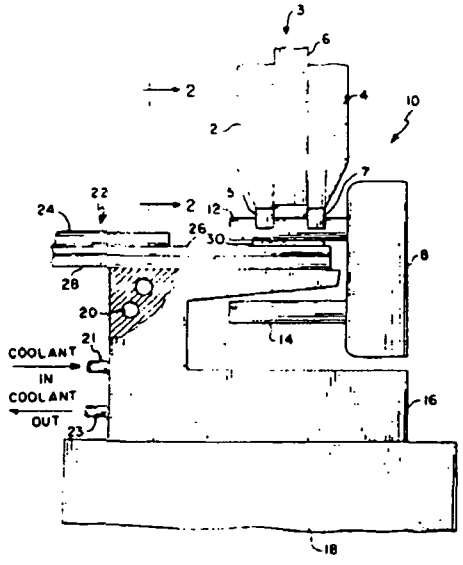
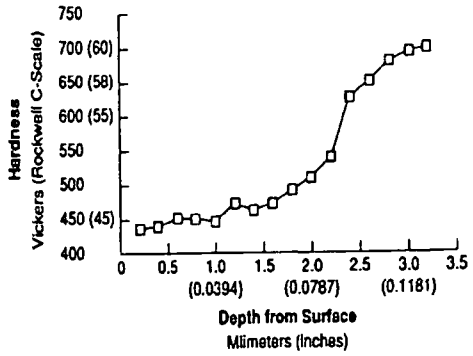


N92-34239*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.
GRADIENT TEMPERING PROCESS Patent Application
RICHARD A. PARR, inventor (to NASA) 14 Aug. 1992 11 p (NASA-CASE-MFS-28496-1; NAS 1.71:MFS-28496-1; US-PATENT-APPL-SN-929553) Avail: CASI HC A03/MF A01

A process for tempering a product made from a metal alloy that produces varying degrees of toughness throughout a cross section of the product is presented.
NASA

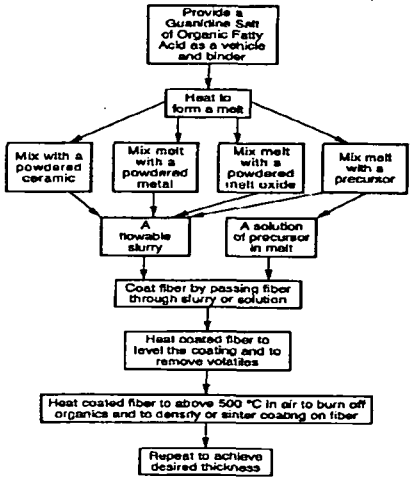


27
NONMETALLIC MATERIALS

Includes physical, chemical, and mechanical properties of plastics, elastomers, lubricants, polymers, textiles, adhesives, and ceramic materials.

N92-23461*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
GUANIDINE BASED VEHICLE/BINDERS FOR USE WITH OXIDES, METALS, AND CERAMICS Patent Application
WARREN H. PHILIPP, inventor (to NASA), LISA C. VEITCH, inventor (to NASA), and MARTHA H. JASKOWIAK, inventor (to NASA) 13 Mar. 1992 14 p(NASA-CASE-LEW-15314-1; NAS 1.71:LEW-15314-1; US-PATENT-APPL-SN-842313) Avail: CASI HC A03/MF A01

The use of guanidine salts of organic fatty acids (guanidine soaps) as vehicles and binders for coating substrate surfaces is disclosed. Being completely organic, the guanidine soaps can be burned off leaving no undesirable residue. Of special interest is the use of guanidine 2-ethyl hexanoate as the vehicle and binder for coating problematic surfaces such as in coating alumina fibers with platinum or zirconia. For this application, the guanidine soap is used as a melt. For applications, the guanidine soap may be use in a solution with a variety of solvents, the solution containing chlorometalates or powdered metals, refractories, or ceramics.
NASA



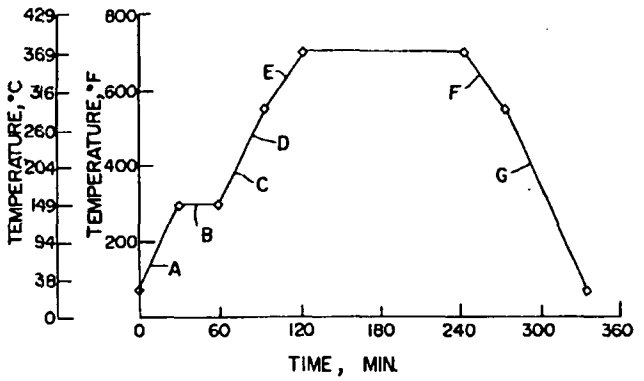
N92-24053*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

VINYL CAPPED ADDITION POLYIMIDES Patent Application

RAYMOND D. VANNUCCI, inventor (to NASA), DIANE C. MALARIK, inventor (to NASA), and PETER DELVIGS, inventor (to NASA) 24 Dec. 1991 15 p (NASA-CASE-LEW-15027-2; NAS 1.71:LEW-15027-2; US-PATENT-APPL-SN-824858) Avail: CASI HC A03/MF A01

Polyimide resins (PMR) are generally useful where high strength and temperature capabilities are required (at temperatures up to about 700 F). Polyimide resins are particularly useful in applications such as jet engine compressor components, for example, blades, vanes, air seals, air splitters, and engine casing parts. Aromatic vinyl capped addition polyimides are obtained by reacting a diamine, an ester of tetracarboxylic acid, and an aromatic vinyl compound. Low void materials with improved oxidative stability when exposed to 700 F air may be fabricated as fiber reinforced high molecular weight capped polyimide composites. The aromatic vinyl capped polyimides are provided with a more aromatic nature and are more thermally stable than highly aliphatic, norbornenyl-type end-capped polyimides employed in PMR resins. The substitution of aromatic vinyl end-caps for norbornenyl end-caps in addition polyimides results in polymers with improved oxidative stability.

NASA



N92-25397* National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.

POLYMER-COATED SURFACES TO CONTROL SURFACE ZETA POTENTIAL Patent

JAMES M. VANALSTINE, inventor (to NASA), J. MILTON HARRIS, inventor (to NASA), STEVE SHAFER, inventor (to NASA), ROBERT S. SNYDER, inventor (to NASA), and BLAIR J. HERREN, inventor (to NASA) 1 Sep. 1987 16 p Filed 16 Dec. 1985 (NASA-CASE-MFS-26050-1; US-PATENT-4,690,749; US-PATENT-APPL-SN-808981; US-PATENT-CLASS-204-299R; US-PATENT-CLASS-204-300EC; US-PATENT-CLASS-428-403; US-PATENT-CLASS-428-405; US-PATENT-CLASS-428-407; INT-PATENT-CLASS-B01D-13/02; INT-PATENT-CLASS-C25D-13/00)Avail:USPatent and Trademark Office

A method for eliminating or controlling electroosmosis and other zeta potential related phenomena in electrophoresis comprising conducting electrophoresis employing electrophoretic surfaces coated with covalently bound hydrophilic, neutral polymers is described. An electrophoretic chamber for eliminating or controlling electroosmosis and other zeta potential related phenomena in electrophoresis comprising electrophoretic surfaces coated with covalently bound hydrophilic, neutral polymers, is also disclosed as well as particles exhibiting controlled electrophoretic mobility. The method and electrophoretic chamber not only eliminate electroosmosis, but allow for specific control of electroosmosis. The coated electrophoretic surface is stable relative to prior art coatings and over a broad range of pH. The point of optical focus for accurate mobility measurements is increased from a narrow stationary level to the entire chamber, facilitating accurate measurements by mechanical means. The method also reduces or eliminates asymmetric fluid flows due to electroosmosis in electrophoretic chambers of square or rectangular cross section.

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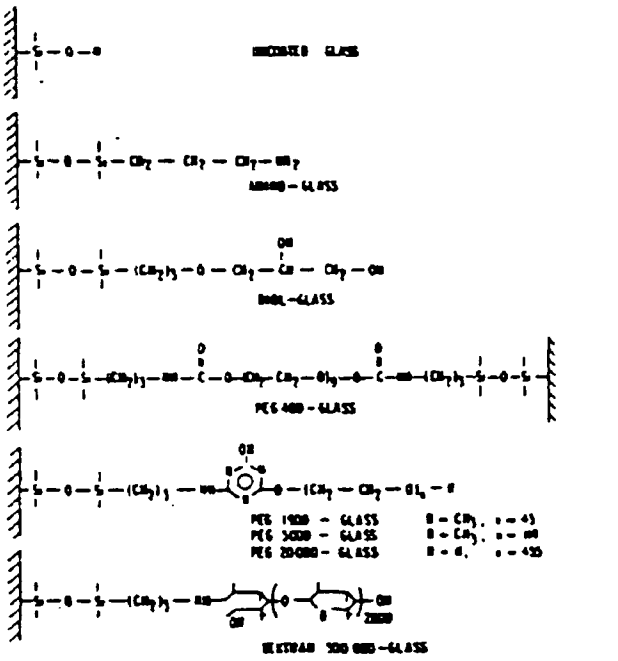

N92-28751* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

POLYIMIDAZOLES VIA AROMATIC NUCLEOPHILIC DISPLACEMENT Patent

JOHN W. CONNELL, inventor (to NASA) and PAUL M. HERGENROTHER, inventor (to NASA) 26 May 1992 8 p Filed 19 Jul. 1991 Supersedes N90-26954 (28 - 21, p 2983) Division of US-Patent-Appl-SN-508316, filed 12 Apr. 1990 (NASA-CASE-LAR-14145-1; US-PATENT-5,116,934; US-PATENT-APPL-SN-732884; US-PATENT-APPL-SN-508316; US-PATENT-CLASS-528-125; US-PATENT-CLASS-528-126; US-PATENT-CLASS-528-127; US-PATENT-CLASS-528-128; US-PATENT-CLASS-528-220; US-PATENT-CLASS-528-224) Avail: US Patent and Trademark Office

Polyimidazoles (PI) are prepared by the aromatic nucleophilic displacement reaction of di(hydroxyphenyl) imidazole monomers with activated aromatic dihalides or activated aromatic dinitro compounds. The reactions are carried out in polar aprotic solvents such as N,N-dimethyl acetamide, sulfolane, N-methylpyrrolidinone, dimethylsulfoxide, or diphenylsulfone using alkali metal bases such as potassium carbonate at elevated temperatures under nitrogen. The di(hydroxyphenyl) imidazole monomers are prepared by reacting an aromatic aldehyde with a dimethoxybenzil or by reacting an aromatic dialdehyde with a methoxybenzil in the presence of ammonium acetate. The di(methoxyphenyl) imidazole is subsequently treated with aqueous hydrobromic acid to give the di(hydroxphenyl)

imidazole monomer. This synthetic route has provided high molecular weight PI of new chemical structure, is economically and synthetically more favorable than other routes, and allows for facile chemical saromatic dihalides and dinitro compounds.

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N92-29090* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

OXIDATION RESISTANT COATING FOR TITANIUM ALLOYS AND TITANIUM ALLOY MATRIX COMPOSITES Patent

WILLIAM J. BRINDLEY, inventor (to NASA), JAMES L. SMIALEK, inventor (to NASA), and CARL J. ROUGE, inventor (to NASA) 26 May 1992 5 p Filed 1 Apr. 1991 Supersedes N91-26375 (29 - 18, p 2966) (NASA-CASE-LEW-15155-1; US-PATENT-5,116,690; US-PATENT-APPL-SN-682160; US-PATENT-CLASS-428-614; US-PATENT-CLASS-428-660; US-PATENT-CLASS-428-661; INT-PATENT-CLASS-B32B-5/02; INT-PATENT-CLASS-B32B-15/01; INT-PATENT-CLASS-B32B-15/20) Avail: US Patent and Trademark Office

An oxidation resistant coating for titanium alloys and titanium alloy matrix composites comprises an MCrAlX material. M is a metal selected from nickel, cobalt, and iron. X is an active element selected from Y, Yb, Zr, and Hf.

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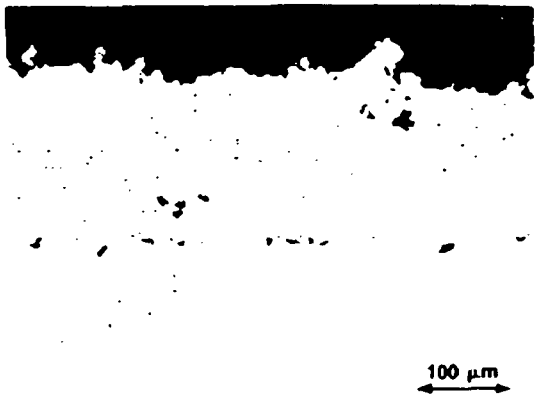


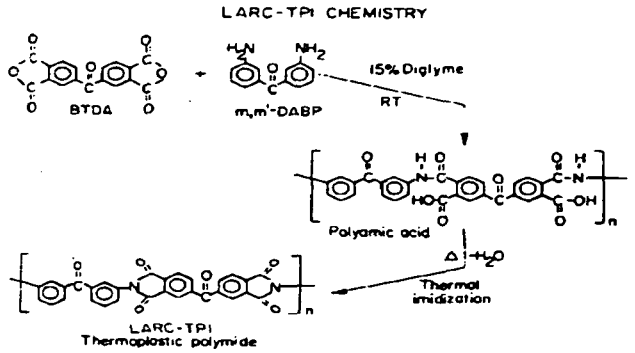
N92-29157* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

POLYIMIDE PROCESSING ADDITIVES Patent

JAMES C. FLETCHER, inventor (to NASA), J. RICHARD PRATT, inventor (to NASA), TERRY L. ST.CLAIR, inventor (to NASA), DIANE M. STOAKLEY, inventor (to NASA), and HAROLD D. BURKS, inventor (to NASA) 26 May 1992 24 p Filed 11 Aug. 1987 (NASA-CASE-LAR-13669-1; US-PATENT-5,116,939; US-PATENT-APPL-SN-084064; US-PATENT-CLASS-528-353; US-PATENT-CLASS-528-179; US-PATENT-CLASS-528-185; US-PATENT-CLASS-528-352; US-PATENT-CLASS-525-420; US-PATENT-CLASS-525-432; INT-PATENT-CLASS-C08F-283/04) Avail: US Patent and Trademark Office

A process for preparing polyimides having enhanced melt flow properties is described. The process consists of heating a mixture of a high molecular weight poly-(amic acid) or polyimide with a low molecular weight amic acid or imide additive in the range of 0.05 to 15 percent by weight of additive. The polyimide powders so obtained show improved processability, as evidenced by lower melt viscosity by capillary rheometry. Likewise, films prepared from mixtures of polymers with additives show improved processability with earlier onset of stretching by TMA.

Official Gazette of the U.S. Patent and Trademark Office



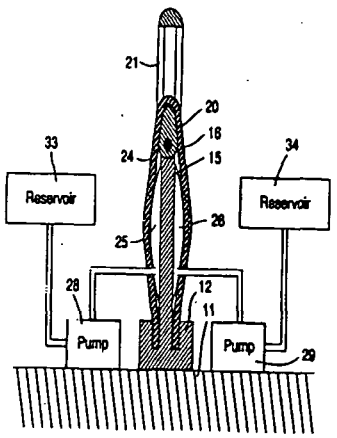
N92-29831*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.

BLADDER OPERATED ROBOTIC JOINT Patent Application

GLEN A. ROBERTSON, inventor (to NASA) 13 Jul. 1992 11 p (NASA-CASE-MFS-28682-1; NAS 1.71:MFS-28682-1; US-PATENT-APPL-SN-912401) Avail: CASI HC A03/MF A01

This invention is a robotic joint which is operated by inflatable bladders and which can be used in applications where it is desired to move or hold an object. A support block supports an elongated plate to which is pivotally attached a finger. A tension strip passes over a lever attached to the finger and is attached at its ends to the support block on opposite sides of the plate. Bladders positioned between the plate and the tension strip on opposite sides of the plate can be inflated by pumps to pivot the finger, with one of the bladders being inflated while the other is being deflated.

NASA



N92-29953*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

POLYBENZIMIDAZOLES VIA AROMATIC NUCLEOPHILIC DISPLACEMENT Patent Application

JOHN W. CONNELL, inventor (to NASA) and PAUL M. HERGENROTHER, inventor (to NASA) 31 Oct. 1991 22 p (NASA-CASE-LAR-14643-1; NAS 1.71:LAR-14643-1; US-PATENT-APPL-SN-790730) Avail: CASI HC A03/MF A01

Polybenzimidazoles (PBIs) are heterocyclic macromolecules commonly prepared by the condensation reaction of an aromatic bis(o-diamine) with an aromatic diacid or derivative thereof. These polymers possess high thermal, thermooxidative, and chemical stability; good mechanical properties; and excellent flame resistances, making them high-performance/high-temperature materials which are attractive for use in harsh environments. However, despite these properties, the processing of these polymers is somewhat difficult. In the present invention, several di(hydroxyphenyl) benzimidazole monomers were prepared from the reaction of phenyl 4 hydroxybenzoate with aromatic bis(o-diamine)s. Soluble PBIs were then prepared by the nucleophilic displacement reaction of these di(hydroxyphenyl) benzimidazole monomers with activated aromatic dihalide or dinitro compounds in the presence of an alkali metal base. These polymers had glass transition temperatures (Tgs) of 264-352 C, much lower than their commercial counterparts which exhibited Tgs of 400 C. The lower Tg allows for better compression moldability than other PBIs. These polymers were soluble in cold dimethylacetamide (DMAc), as opposed to requiring hot DMAc and pressure to solubilize. The use of the benzimidazole monomers to make PBIs proved to be more economical and easier to process than commercial PBIs. The novelty of this invention lies in the polybenzimidazole polymers. These new compositions of matter exhibited lower TGs and increased solubility which allows for easier processing.

NASA

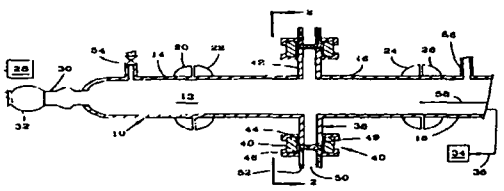
N92-30100*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.

A METHOD FOR MAKING BIOCOMPATIBLE POLYMER ARTICLES USING ATOMIC OXYGEN Patent Application

STEVEN KOONTZ, inventor (to NASA) and GLENN SPAULDING, inventor (to NASA) 26 Mar. 1992 31 p (NASA-CASE-MSC-21529-1; NAS 1.71:MSC-21529-1; US-PATENT-APPL-SN-857901) Avail: CASI HC A03/MF A01

A method for making a biocompatible polymer article using a uniform atomic oxygen treatment is disclosed. The substrate may be subsequently optionally grafted with a compatibilizing compound. Compatibilizing compounds may include proteins, phosphorylcholine groups, platelet adhesion preventing polymers, albumin adhesion promoters, and the like. The compatibilized substrate may also have a living cell layer adhered thereto. The atomic oxygen is preferably produced by a flowing afterglow microwave discharge, wherein the substrate resides in a sidearm out of the plasma. Also disclosed are a vascular prosthesis and other articles made by the biocompatibilizing method of the present invention as well as methods for using such biocompatibilized articles in a cell mass. In addition, various membranes made by the biocompatibilizing method of the present invention are disclosed. Furthermore, methods are disclosed for performing immunodiagnostic testing using the membranes. Also, methods for culturing cells for various purposes using the various membranes are disclosed as well.

NASA



N92-30313*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

POLYIMIDES CONTAINING THE CYCLOBUTENE-3,4-DIONE MOIETY Patent Application

TERRY L. ST.CLAIR, inventor (to NASA) 3 Mar. 1992 12 p (NASA-CASE-LAR-14753-1; NAS 1.71:LAR-14753-1; US-PATENT-APPL-SN-845090) Avail: CASI HC A03/MF A01

In the present invention, linear aromatic polyimides containing the cyclobutene-3,4-dione moiety were produced from the reaction of a substituted or unsubstituted 1,2-bis(4-aminoanilino) cyclobutene-3,4-dione (SQDA) with various aromatic dianhydrides. These polymers had high molecular weights and their glass transition temperatures (Tgs) were greater than 500 C. Despite the very high Tg, these polymers exhibited excellent adhesion to glass. In addition, the films of these polyimides increased in flexibility with increasing cure temperatures. The novelty of this invention lies in the linear aromatic polyimide containing the cyclobutene-3,4-dione moiety. The presence of this moiety causes such changes in properties as Tgs greater than 500 C, excellent adhesion to glass, and increased flexibility with increasing cure temperatures.

NASA

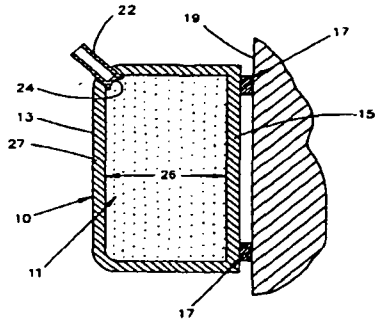
N92-30539*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.

ABLATIVE SHIELDING FOR HYPERVELOCITY PROJECTILES Patent Application

MICHELLE A. RUCKER, inventor (to NASA) 21 May 1992 16 p (NASA-CASE-MSC-21884-1; NAS 1.71:MSC-21884-1; US-PATENT-APPL-SN-887674) Avail: CASI HC A03/MF A01

A hypervelocity projectile shield which includes a hollow semi-flexible housing fabricated from a plastic like, or otherwise transparent membrane which is filled with a fluid (gas or liquid) is presented. The housing has a inlet valve, similar to that on a tire or basketball, to introduce an ablating fluid into the housing. The housing is attached by a Velcro mount or double-sided adhesive tape to the outside surface of a structure to be protected. The housings are arrayed in a side-by-side relationship for complete coverage of the surface to be protected. In use, when a hypervelocity projectile penetrates the outer wall of a housing it is broken up and then the projectile is ablated as it travels through the fluid, much like a meteorite 'burns up' as it enters the earth's atmosphere, and the housing is deflated. The deflated housing can be easily spotted for replacement, even from a distance. Replacement is then accomplished by simply pulling a deflated housing off the structure and installing a new housing.

NASA



N92-31792* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
IMIDE/ARYLENE ETHER COPOLYMERS Patent
BRIAN J. JENSEN, inventor (to NASA), PAUL M. HERGENROTHER, inventor (to NASA), and ROBERT G. BASS, inventor (to NASA) 12 May 1992 9 p Filed 21 Nov. 1989 Supersedes N90-26953 (27 - 21, p 2983) (NASA-CASE-LAR-14159-1-CU; US-PATENT-5,112,923; US-PATENT-APPL-SN-439317; US-PATENT-CLASS-525-420; US-PATENT-CLASS-525-434; US-PATENT-CLASS-525-436; INT-PATENT-CLASS-C08L-79/08) Avail: US Patent and Trademark Office

Imide/arylene ether block copolymers are prepared by reacting anhydride terminated poly(amic acids) with amine terminated poly(arylene ethers) in polar aprotic solvents and by chemically or thermally cyclodehydrating the resulting intermediate poly(amic acids). The resulting block copolymers have one glass transition temperature or two, depending upon the particular structure and/or the compatibility of the block units. Most of these block copolymers form tough, solvent resistant films with high tensile properties.

Official Gazette of the U.S. Patent and Trademark Office

N92-33008* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
POLYIMIDES WITH CARBONYL AND ETHER CONNECTING GROUPS BETWEEN THE AROMATIC RINGS Patent
PAUL M. HERGENROTHER, inventor (to NASA) and STEPHEN J. HAVENS, inventor (to NASA) 8 Sep. 1992 10 p Filed 9 Nov. 1989 Supersedes N90-15260 (28 - 7, p 910) (NASA-CASE-LAR-14001-1; US-PATENT-5,145,937; US-PATENT-APPL-SN-433812; US-PATENT-CLASS-528-125; US-PATENT-CLASS-528-128; US-PATENT-CLASS-528-172; US-PATENT-CLASS-528-185; US-PATENT-CLASS-528-229; US-PATENT-CLASS-528-352; US-PATENT-CLASS-528-353) Avail: US Patent and Trademark Office

New polyimides have been prepared from the reaction of aromatic dianhydrides with novel aromatic diamines containing carbonyl and ether connecting groups between the aromatic rings. Several of these polyimides are shown to be semi-crystalline as evidenced by wide angle x ray diffraction and differential scanning calorimetry. Most of the polyimides form tough solvent resistant films with high tensile properties. Several of these materials can be thermally processed to form solvent and base resistant moldings.

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N92-33014* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
POLYIMIDE MOLDING POWDER, COATING, ADHESIVE, AND MATRIX RESIN Patent
TERRY L. ST.CLAIR, inventor (to NASA) and DONALD J. PROGAR, inventor (to NASA) 15 Sep. 1992 6 p Filed 31 Jul. 1990 Supersedes N91-13559 (29 - 5, p 642) (NASA-CASE-LAR-14163-1; US-PATENT-5,147,966; US-PATENT-APPL-SN-560717; US-PATENT-CLASS-528-188; US-PATENT-CLASS-528-125; US-PATENT-CLASS-528-126; US-PATENT-CLASS-528-128; US-PATENT-CLASS-528-173; US-PATENT-CLASS-528-179; US-PATENT-CLASS-528-182) Avail: US Patent and Trademark Office

The invention is a polyimide prepared from 3,4'-oxydianiline (3,4'-ODA) and 4,4'-oxydiphthalic anhydride (ODPA), in 2-methoxyethyl ether (diglyme). The polymer was prepared in ultra high molecular weight and in a controlled molecular weight form which has a 2.5 percent offset in stoichiometry (excess diamine) with a 5.0 percent level of phthalic anhydride as an endcap. This controlled molecular weight form allows for greatly improved processing of the polymer for moldings, adhesive bonding, and composite fabrication. The higher molecular weight version affords tougher films and coatings. The overall polymer structure groups in the dianhydride, the diamine, and a metal linkage in the diamine affords adequate flow properties for making this polymer useful as a molding powder, adhesive, and matrix resin.

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N92-33015* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
METHYL SUBSTITUTED POLYIMIDES CONTAINING CARBONYL AND ETHER CONNECTING GROUPS Patent
PAUL M. HERGENROTHER, inventor (to NASA) and STEPHEN J. HAVENS, inventor (to NASA) 8 Sep. 1992 8 p Filed 28 Sep. 1990 Supersedes N91-13561(29 - 5, p 642) (NASA-CASE-LAR-14351-1; US-PATENT-5,145,942; US-PATENT-APPL-SN-589571; US-PATENT-CLASS-528-353; US-PATENT-CLASS-528-125; US-PATENT-CLASS-528-128; US-PATENT-CLASS-528-172; US-PATENT-CLASS-528-185; US-PATENT-CLASS-528-352; US-PATENT-CLASS-564-315) Avail: US Patent and Trademark Office

Polyimides were prepared from the reaction of aromatic dianhydrides with novel aromatic diamines having carbonyl and ether groups connecting aromatic rings containing pendant methyl groups. The methyl substituent polyimides exhibit good solubility and form tough, strong films. Upon exposure to ultraviolet irradiation and/or heat, the methyl substituted polyimides crosslink to become insoluble.

Official Gazette of the U.S. Patent and Trademark Office

N92-34160* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
BORON-CARBON-SILICON POLYMERS AND CERAMIC AND A PROCESS FOR THE PRODUCTION THEREOF Patent
SALVATORE RICCITIELLO, inventor (to NASA), MING-TA HSU, inventor (to NASA), and TIMOTHY S. CHEN, inventor (to NASA) 14 Jul. 1992 8 p Filed 18 Jan. 1991 Division of US-Patent-Appl-SN-361471, filed 5 Jun. 1989 (NASA-CASE-ARC-11891-2-SB; US-PATENT-5,130,278; US-PATENT-APPL-SN-643629; US-PATENT-APPL-SN-361471; US-PATENT-CLASS-501-92; US-PATENT-CLASS-501-93; US-PATENT-CLASS-501-96; US-PATENT-CLASS-501-97; INT-PATENT-CLASS-C04B-35/56) Avail: US Patent and Trademark Office

The present invention relates to a process for the production of an organoborosilicon preceramic polymer. The polymer is prepared by the reaction of vinylsilane or vinlymethylsilanes (acetylene)silane or acetylene alkyl silanes and borane or borane derivatives. The prepolymer form is pyrolyzed to produce a ceramic article useful in high temperature (e.g., aerospace) or extreme environmental applications.

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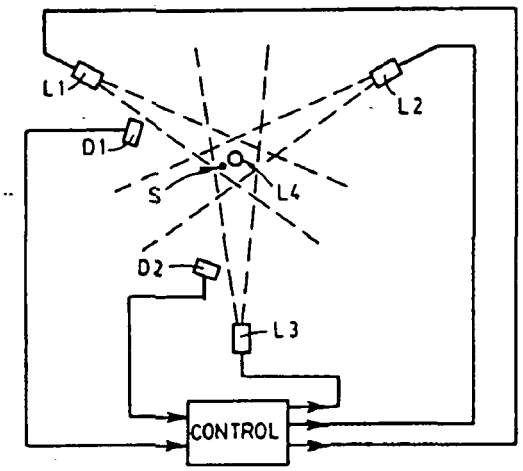
29
MATERIALS PROCESSING

Includes space-based development of products and processes for commercial applications.

N92-30083*# National Aeronautics and Space Administration. Pasadena Office, CA.
SAMPLE POSITIONING IN MICROGRAVITY Patent Application
GOVIND SRIDHARAN, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 1 Nov. 1991 16 p

(Contract NAS7-918)
(NASA-CASE-NPO-18448-1-CU; NAS 1.71:NPO-18448-1-CU; US-PATENT-APPL-SN-786612) Avail: CASI HC A03/MF A01

Repulsion forces arising from laser beams are provided to produce mild positioning forces on a sample in microgravity vacuum environments. The system of the preferred embodiment positions samples using a plurality of pulsed lasers providing opposing repulsion forces. The lasers are positioned around the periphery of a confinement area and expanded to create a confinement zone. The grouped laser configuration, in coordination with position sensing devices, creates a feedback servo whereby stable position control of a sample within microgravity environment can be achieved.
NASA



31
ENGINEERING (GENERAL)

Includes vacuum technology; control engineering; display engineering; cryogenics; and fire prevention.

N92-33020* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
FLUSH MOUNTING OF THIN FILM SENSORS Patent
THOMAS C. MOORE, SR., inventor (to NASA) 22 Sep. 1992 4 p Filed 6 May 1991 Supersedes N91-28454 (29 - 20, p 3332) (NASA-CASE-LAR-14446-1; US-PATENT-5,149,387; US-PATENT-APPL-SN-699288; US-PATENT-APPL-156-241; US-PATENT-APPL-29-856; US-PATENT-APPL-156-285; US-PATENT-APPL-156-293; US-PATENT-APPL-264-272.15; INT-PATENT-CLASS-B29C-65/48) Avail: US Patent and Trademark Office

Flush mounting of a sensor on a surface is provided by first forming a recessed area on the surface. Next, an adhesive bonding mixture is introduced into the recessed area. The adhesive bonding mixture is chosen to provide thermal expansion matching with the surface surrounding the recessed area. A strip of high performance polymeric tape is provided, with the sensor attached to the underside thereof, and the tape is positioned over the recessed area so that it acts as a carrier of the sensor. A shim having flexibility so that it will conform to the surface surrounding the recessed area is placed over the tape, and a vacuum pad is placed over the shim. The area above the surface is then evacuated while holding the sensor flush with the surface during curing of the adhesive bonding mixture. After such curing, the pad, shim, and tape are removed from the sensor, electrical connections for the sensor are provided, after which the remaining space in the recessed area is filled with a polymeric foam.
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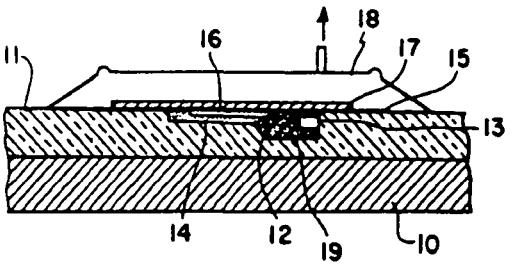

N92-33612* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
SHARPS CONTAINER Patent
ANGELENE M. LEE, inventor (to NASA) 8 Sep. 1992 5 p Filed 7 Oct. 1991 Supersedes N92-17913 (30 - 8, p 1278) (NASA-CASE-MSC-21776-1; US-PATENT-5,145,063; US-PATENT-APPL-SN-772763; US-PATENT-CLASS-206-364; US-PATENT-CLASS-206-366; US-PATENT-CLASS-206-370; US-PATENT-CLASS-206-818; US-PATENT-CLASS-220-908; INT-PATENT-CLASS-B65D-83/10) Avail: US Patent and Trademark Office

This invention relates to a system for use in disposing of potentially hazardous items and more particularly a Sharps receptacle for used hypodermic needles and the like. A Sharps container is constructed from lightweight alodined nonmagnetic metal material with a cup member having an elongated tapered shape and length greater than its transverse dimensions. A magnet in the cup member provides for metal retention in the container. A nonmagnetic lid member has an opening and spring biased closure flap member. The flap member is constructed from stainless steel. A Velcro patch on the container permits selective attachment at desired locations.
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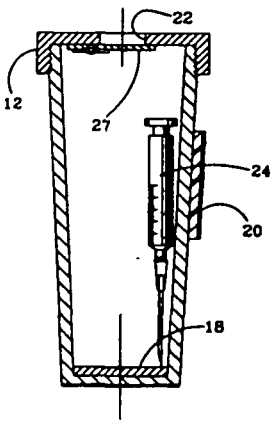

32
COMMUNICATIONS AND RADAR

Includes radar; land and global communications; communications theory; and optical communications.

N92-29124* National Aeronautics and Space Administration. Pasadena Office, CA.

METHOD AND APPARATUS FOR FREQUENCY SPECTRUM ANALYSIS Patent

STEVEN W. COLE, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 16 Jun. 1992 10 p Filed 25 Feb. 1991 Supersedes N92-10125 (30 - 1, p 25) (NASA-CASE-NPO-17759-1-CU; US-PATENT-5,122,731; US-PATENT-APPL-SN-660371; US-PATENT-CLASS-324-77C; US-PATENT-CLASS-324-77CS; US-PATENT-CLASS-324-78F; US-PATENT-CLASS-324-78D; INT-PATENT-CLASS-G01R-23/16) Avail: US Patent and Trademark Office

A method for frequency spectrum analysis of an unknown signal in real-time is discussed. The method is based upon integration of 1-bit samples of signal voltage amplitude corresponding to sine or cosine phases of a controlled center frequency clock which is changed after each integration interval to sweep the frequency range of interest in steps. Integration of samples during each interval is carried out over a number of cycles of the center frequency clock spanning a number of cycles of an input signal to be analyzed. The invention may be used to detect the frequency of at least two signals simultaneously. By using a reference signal of known frequency and voltage amplitude (added to the two signals for parallel processing in the same way, but in a different channel with a sampling at the known frequency and phases of the reference signal), the absolute voltage amplitude of the other two signals may be determined by squaring the sine and cosine integrals of each channel and summing the squares to obtain relative power measurements in all three channels and, from the known voltage amplitude of the reference signal, obtaining an absolute voltage measurement for the other two signals by multiplying the known voltage of the reference signal with the ratio of the relative power of each of the other two signals to the relative power of the reference signal.

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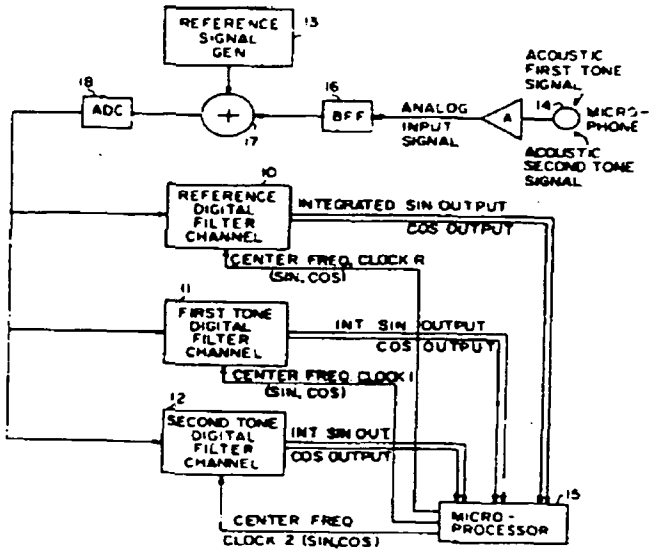


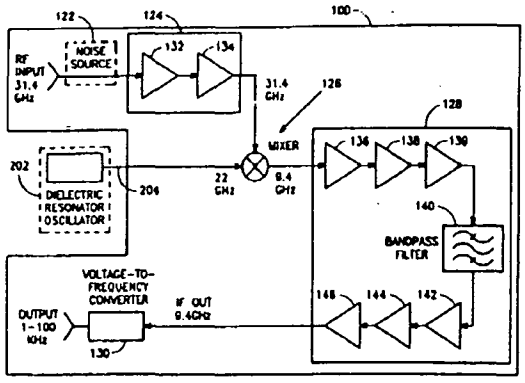
N92-30103*# National Aeronautics and Space Administration. Pasadena Office, CA.

MINIATURE MODULAR MICROWAVE END-TO-END RECEIVER Patent Application

LIN M. SUKAMTO, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.), THOMAS W. COOLEY, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.), MICHAEL A. JANSSEN, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.), and GARY S. PARKS, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 3 Dec. 1991 28 p (Contract NAS7-918) (NASA-CASE-NPO-18713-1-CU; NAS 1.71:NPO-18713-1-CU; US-PATENT-APPL-SN-802078) Avail: CASI HC A03/MF A01

An end-to-end microwave receiver system contained in a single miniature hybrid package mounted on a single heatsink is presented. It includes an input end connected to a microwave receiver antenna and an output end which produces a digital count proportional to the amplitude of a signal of a selected microwave frequency band received at the antenna and corresponding to one of the water vapor absorption lines near frequencies of 20 GHz or 30 GHz. The hybrid package is on the order of several centimeters in length and a few centimeters in height and width. The package includes an L-shaped carrier having a base surface, a vertical wall extending up from the base surface and forming a corner therewith, and connection pins extending through the vertical wall. Modular blocks rest on the base surface against the vertical wall and support microwave monolithic integrated circuits on top surfaces thereof connected to the external connection pins. The modular blocks lie end-to-end on the base surface so as to be modularly removable by sliding along the base surface beneath the external connection pins away from the vertical wall.

NASA



N92-30391*# National Aeronautics and Space Administration. Pasadena Office, CA.

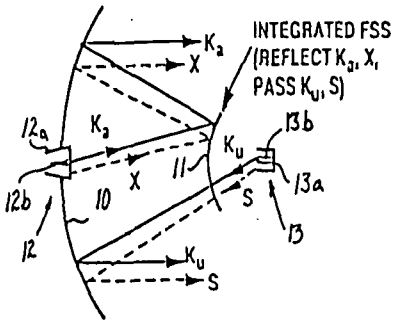
DOUBLE-LOOP FREQUENCY-SELECTED SURFACES FOR MULTIFREQUENCY DIVISION MULTIPLEXING IN A DUAL-REFLECTOR ANTENNA Patent Application

TE-KAO WU, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 24 Jun. 1992 38 p (Contract NAS7-918)
(NASA-CASE-NPO-18701-1-CU; NAS 1.71:NPO-18701-1-CU; US-PATENT-APPL-SN-909501) Avail: CASI HC A03/MF A01

A multireflector antenna utilizes a frequency-selective surface (FSS) in a subreflector to allow signals in two different radio frequency (RF) bands to be selectively reflected back into a main reflector and to allow signals in other RF bands to be transmitted through it to the main reflector for primary focus transmission. A first

approach requires only one FSS at the subreflector which may be an array of double-square-loop conductive elements. A second approach uses two FSS's at the subreflector which may be an array of either double-square-loop (DSL) or double-ring (DR). In the case of DR elements, they may be advantageously arranged in a triangulararray instead of the rectangular array for the DSL elements.

NASA



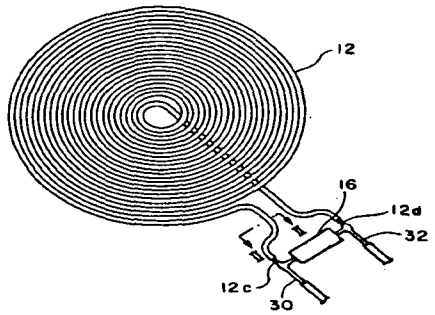
N92-31150*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

FLEXIBLE HEATING HEAD FOR INDUCTION HEATING APPARATUS AND METHOD Patent Application

ROBERT H. COULTRIP, inventor (to NASA) (Inductron Corp., Yorktown, VA.), CARL E. COPELAND, inventor (to NASA) (Inductron Corp., Yorktown, VA.), ROBERT L. FOX, inventor (to NASA), SAMUEL D. JR. JOHNSON, inventor (to NASA) (Inductron Corp., Yorktown, VA.), W. MORRIS PHILLIPS, inventor (to NASA) (Inductron Corp., Yorktown, VA.), and JOHN D. BUCKLEY, inventor (to NASA) 31 Oct. 1991 17 p (NASA-CASE-LAR-14679-2; US-PATENT-APPL-SN-790731) Avail: CASI HC A03/MF A01

An induction heating head includes: a length of wire having first and second opposite ends and being wound in a flat spiral shape to form an induction coil; a capacitor connected to the first and second ends of the wire, the induction coil and capacitor defining a tank circuit; and a flexible, elastomeric body molded to encase the induction coil. When a susceptor is placed in juxtaposition to the body, and the tank circuit is powered, the susceptor is inductively heated.

NASA



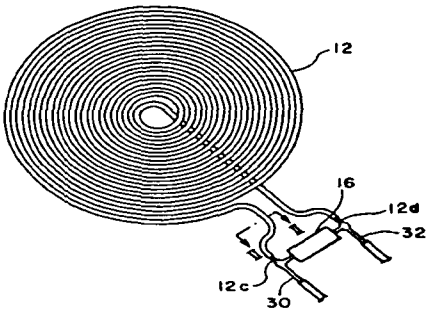
N92-31257*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

FLEXIBLE HEATING HEAD FOR INDUCTION HEATING APPARATUS AND METHOD Patent Application

ROBERT L. FOX, inventor (to NASA), SAMUEL D. JOHNSON, inventor (to NASA) (Inductron Corp., Yorktown, VA.), ROBERT H. COULTRIP, inventor (to NASA) (Inductron Corp., Yorktown, VA.), and W. MORRIS PHILLIPS, inventor (to NASA) (Inductron Corp., Yorktown, VA.) 31 Oct. 1991 17 p (NASA-CASE-LAR-14418-1; NAS 1.71:LAR-14418-1; US-PATENT-APPL-SN-790723) Avail: CASI HC A03/MF A01

An induction heating head includes a length of wire having first and second opposite ends and being wound in a flat spiral shape to form an induction coil, a capacitor connected to the first and second ends of the wire, the induction coil and capacitor defining a tank circuit, and a flexible, elastomeric body molded to encase the induction coil. When a susceptor is placed in juxtaposition to the body, and the tank circuit is powered, the susceptor is inductively heated.

NASA



33

ELECTRONICS AND ELECTRICAL ENGINEERING

Includes test equipment and maintainability; components, e.g., tunnel diodes and transistors; microminiaturization; and integrated circuitry.

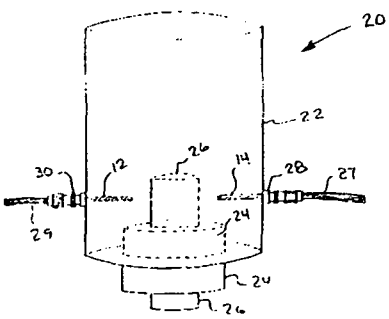
N92-23462*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.

COAXIAL TURNSTILE JUNCTION Patent Application

ROBERT K. ZIMMERMAN, JR., inventor (to NASA) 7 Oct. 1991 20p (NASA-CASE-GSC-13422-1; NAS 1.71:GSC-13422-1; US-PATENT-APPL-SN-772741) Avail: CASI HC A03/MF A01

A microwave turnstile junction is shown consisting of a circular waveguide at the center, four coplanar microwave probes extending into the circular waveguide at one end, and each probe having a coaxial connector affixed at one end and mounted upon the circular waveguide. The circular waveguide has a pair of coaxial sliding plungers mounted at one end. The plungers are capable of extending into the circular waveguide so as to interact with the probes. The novelty is believed to reside in using coaxial cables with coaxial-to-waveguide probes as a replacement for the square waveguide of the prior art turnstiles.

NASA



N92-23464*# National Aeronautics and Space Administration. Pasadena Office, CA.

PLANAR VARACTOR FREQUENCY MULTIPLIER DEVICES WITH BLOCKING BARRIER Patent Application

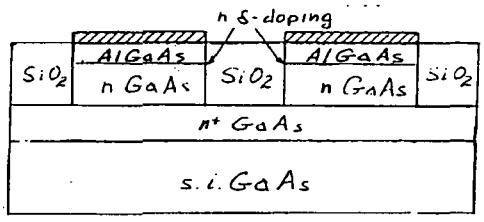
UDO LIENEWEG, inventor (to NASA), MARGARET A. FRERKING, inventor (to NASA), and JOSEPH MASERIAN, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 26 Feb. 1992 31 p

(Contract NAS7-918)

(NASA-CASE-NPO-18428-1-CU; NAS 1.71:NPO-18428-1-CU; US-PATENT-APPL-SN-842297) Avail: CASI HC A03/MF A01

The invention relates to planar varactor frequency multiplier devices with a heterojunction blocking barrier for near millimeter wave radiation of moderate power from a fundamental input wave. The space charge limitation of the submillimeter frequency multiplier devices of the BIN(sup +) type is overcome by a diode structure comprising an n(sup +) doped layer of semiconductor material functioning as a low resistance back contact, a layer of semiconductor material with n-type doping functioning as a drift region grown on the back contact layer, a delta doping sheet forming a positive charge at the interface of the drift region layer with a barrier layer, and a surface metal contact. The layers thus formed on an n(sup +) doped layer may be divided into two isolated back-to-back BNN(sup +) diodes by separately depositing two surface metal contacts. By repeating the sequence of the drift region layer and the barrier layer with the delta doping sheet at the interfaces between the drift and barrier layers, a plurality of stacked diodes is formed. The novelty of the invention resides in providing n-type semiconductor material for the drift region in a GaAs/AlGaAs structure, and in stacking a plurality of such BNN(sup +) diodes stacked for greater output power with and connected back-to-back with the n(sup +) GaAs layer as an internal back contact and separate metal contact over an AlGaAs barrier layer on top of each stack.

NASA



N92-24246*# National Aeronautics and Space Administration. Pasadena Office, CA.

AN IMPROVED SNS SUPERCONDUCTING JUNCTION WITH WEAK LINK BARRIER AND METHOD OF PRODUCING Patent Application

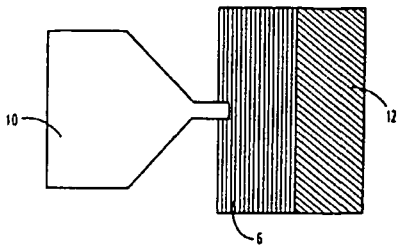
B. D. HUNT, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 19 Mar. 1992 27 p

(Contract NAS7-918)

(NASA-CASE-NPO-18552-1-CU; NAS 1.71:NPO-18552-1-CU; US-PATENT-APPL-SN-854124) Avail: CASI HC A03/MF A01

A method of producing a high temperature superconductor Josephson element and an improved SNS weak link barrier element is provided. A YBaCuO superconducting electrode film is deposited on a substrate at a temperature of approx. 800 C. A weak link barrier layer of a nonsuperconducting film of N-YBaCuO is deposited over the electrode at a temperature range of 520 to 540 C at a lower deposition rate. Subsequently, a superconducting counter-electrode film layer of YBaCuO is deposited over the weak link barrier layer at approx. 800 C. The weak link barrier layer has a thickness of approx. 50 A and the SNS element can be constructed to provide an edge geometry junction.

NASA



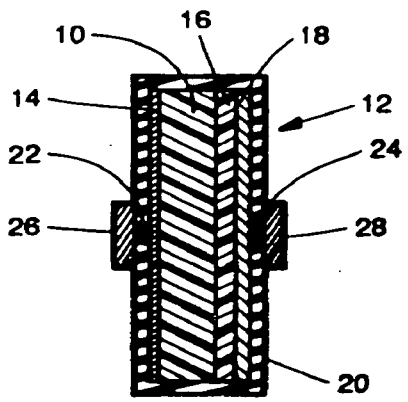
N92-28753* National Aeronautics and Space Administration. Pasadena Office, CA.

SECONDARY LI BATTERY INCORPORATING 12-CROWN-4 ETHER Patent

GANESAN NAGASUBRAMANIAN, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) and SALVADOR DISTEFANO, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 5 May 1992 8 p Filed 11 Oct. 1990 Supersedes N91-13621 (29 - 5, p 652) (NASA-CASE-NPO-17922-1-CU; US-PATENT-5,110,694; US-PATENT-APPL-SN-596139; US-PATENT-CLASS-429-192; US-PATENT-CLASS-252-62.2; INT-PATENT-CLASS-H01M-10/40) Avail: US Patent and Trademark Office

A rechargeable lithium battery which utilizes a polyethylene oxide (PEO) solid polymeric electrolyte complexed with a lithium salt is disclosed. The conductivity is increased an order of magnitude and interfacial charge transfer resistance is substantially decreased by incorporating a minor amount of 12-Crown-4 ether in the PEO-lithium salt solid electrolyte film. Batteries containing the improved electrolyte permit operation at a lower temperature with improved efficiency.

Official Gazette of the U.S. Patent and Trademark Office



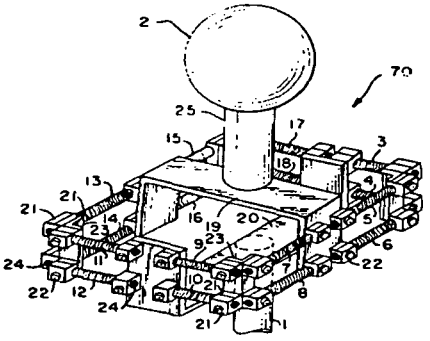
N92-29153* National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.

USER FRIENDLY JOYSTICK Patent

WAYNE D. EKLUND, inventor (to NASA) and JAMES J. KERLEY, inventor (to NASA) 19 May 1992 10 p Filed 20 Feb. 1991 (NASA-CASE-GSC-13187-1;US-PATENT-5,113,714;US-PATENT-APPL-SN-657790; US-PATENT-CLASS-74-471XY; US-PATENT-CLASS-248-65; US-PATENT-CLASS-24868.1;US-PATENT-CLASS-273-148B; US-PATENT-CLASS- 338-128; INT-PATENT-CLASS-G05G-9/00) Avail: US Patent and Trademark Office

A joystick control device having a lower U-shaped bracket, an upper U-shaped bracket, a handle attached to the upper U-shaped bracket, with the upper U-shaped bracket connected to the lower U-shaped bracket by a compliant joint allowing six degrees of freedom for the joystick. The compliant joint consists of at least one cable segment affixed between the lower U-shaped bracket and the upper U-shaped bracket. At least one input device is located between the lower U-shaped bracket and the upper U-shaped bracket.

Official Gazette of the U.S. Patent and Trademark Office



N92-30086*# National Aeronautics and Space Administration. Pasadena Office, CA.

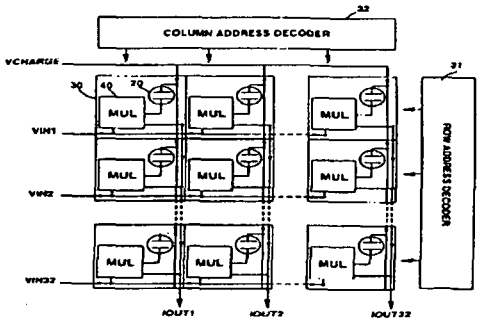
NONVOLATILE PROGRAMMABLE NEURAL NETWORK SYNAPTIC ARRAY Patent Application

RAOUL TAWEL, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 8 Jul. 1992 20 p (Contract NAS7-918)

(NASA-CASE-NPO-18578-1-CU; NAS 1.71:NPO-18578-1-CU; US-PATENT-APPL-SN-912956) Avail: CASI HC A03/MF A01

A floating-gate metal oxide semiconductor (MOS) transistor is implemented for use as a nonvolatile analog storage element of a synaptic cell used to implement an array of processing synaptic cells. These cells are based on a four-quadrant analog multiplier requiring both X and Y differential inputs, where one Y input is UV programmable. These nonvolatile synaptic cells are disclosed fully connected in a 32 x 32 synaptic cell array using standard very large scale integration (VLSI) complementary MOS (CMOS) technology.

NASA



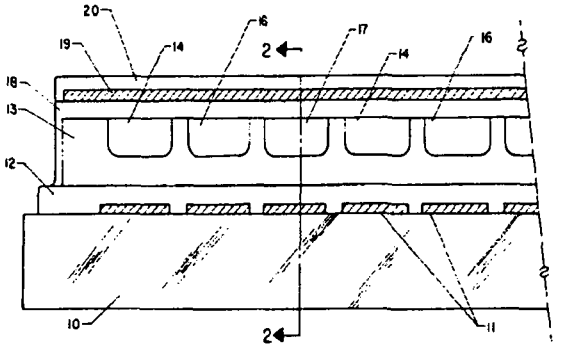
N92-30389*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

A METHOD OF MAKING A SINGLE LAYER MULTI-COLOR LUMINESCENT DISPLAY Patent Application

JAMES B. ROBERTSON, inventor (to NASA) 24 Mar. 1992 13 p (NASA-CASE-LAR-14811-1; NAS 1.71:LAR-14811-1; US-PATENT-APPL-SN-858176) Avail: CASI HC A03/MF A01

The invention is a method of forming a multi-color luminescent display including the steps of depositing on an insulator substrate a smooth single layer of host material which itself may be a phosphor with the properties to host varying quantities of different impurities and introducing one or more of said different impurities into selected areas of the single layer of host material via an appropriately positioned mask as by thermal diffusion or ion-implantation to form a pattern of phosphors of different colors in the single layer of host material such that the top surface of the host layer remains smooth. Red phosphors are formed by adding impurities selected from the group consisting of Sm, SmF3, Eu, EuF3, and ZnS:MnTbF3 to a ZnS host; green phosphors by adding impurities selected from the group consisting of Tb and TbF3 to a ZnS host; and blue phosphors by adding impurities selected from the group consisting of Tm, Al, Ag, and Mg to a ZnS host.

NASA



N92-30542*# National Aeronautics and Space Administration. Pasadena Office, CA.

HYBRIDIZATION OF DETECTOR ARRAY AND INTEGRATED CIRCUIT FOR READOUT Patent Application

ERIC R. FOSSUM, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) and FRANK J. GRUNTHANER, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 29 Apr. 1992 18 p

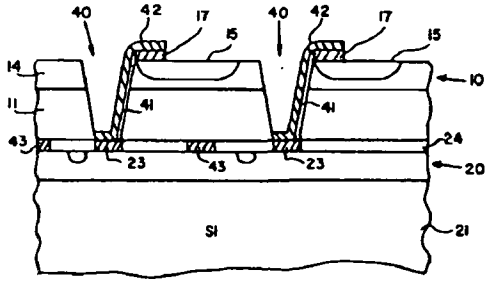
(Contract NAS7-918)

(NASA-CASE-NPO-18062-1-CU; NAS 1.71:NPO-18062-1-CU; US-PATENT-APPL-SN-877966) Avail: CASI HC A03/MF A01

A process is explained for fabricating a detector array in a layer of semiconductor material on one substrate and an integrated readout circuit in a layer of semiconductor material on a separate substrate in order to select semiconductor material for optimum performance of each structure, such as GaAs for the detector array and Si for the integrated readout circuit. The detector array layer is lifted off its substrate, laminated on the metallized surface on the integrated surface, etched with reticulating channels to the surface of the integrated circuit, and provided with interconnections between the detector array pixels and the integrated readout circuit through the channels. The adhesive material for the lamination is selected to

be chemically stable to provide electrical and thermal insulation and to provide stress release between the two structures fabricated in semiconductor materials that may have different coefficients of thermal expansion.

NASA



N92-33011* National Aeronautics and Space Administration. Pasadena Office, CA.

VLSI ARCHITECTURE FOR A REED-SOLOMON DECODER Patent

IN-SHEK HSU, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) and TRIEU-KIE TRUONG, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 14 Jul. 1992 12 p Filed 15 Feb. 1990 Supersedes N90-27040 (28 - 21, p 2998)

(NASA-CASE-NPO-17897-1-CU; US-PATENT-5,130,990; US-PATENT-APPL-SN-480449; US-PATENT-CLASS-371-37.1; INT-PATENT-CLASS-G06F-11/10) Avail: US Patent and Trademark Office

A basic single-chip building block for a Reed-Solomon (RS) decoder system is partitioned into a plurality of sections, the first of which consists of a plurality of syndrome subcells each of which contains identical standard-basis finite-field multipliers that are programmable between 10 and 8 bit operation. A desired number of basic building blocks may be assembled to provide a RS decoder of any syndrome subcell size that is programmable between 10 and 8 bit operation.

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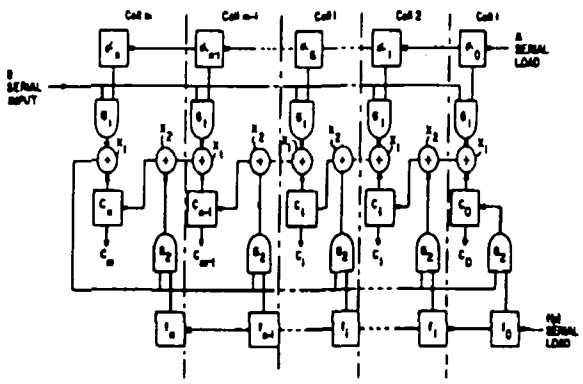

N92-33021* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

VACUUM-ISOLATION VESSEL AND METHOD FOR MEASUREMENT OF THERMAL NOISE IN MICROPHONES Patent

ALLAN J. ZUCKERWAR, inventor (to NASA) and KIM CHI T. NGO, inventor (to NASA) 15 Sep. 1992 9 p Filed 7 Oct. 1991 Supersedes N92-12174 (30 - 3, p 384)

(NASA-CASE-LAR-14567-1-CU; US-PATENT-5,146,780; US-PATENT-APPL-SN-773376; US-PATENT-CLASS-374-175; US-PATENT-CLASS-73-1H; US-PATENT-CLASS-73-571; INT-PATENT-CLASS-G01K-7/30) Avail: US Patent and Trademark Office

The vacuum isolation vessel and method in accordance with the present invention are used to accurately measure thermal noise in microphones. The apparatus and method could be used in a microphone calibration facility or any facility used for testing microphones. Thermal noise is measured to determine the minimum detectable sound pressure by the microphone. Conventional isolation apparatus and methods have been unable to provide an acoustically quiet and substantially vibration free environment for accurately measuring thermal noise. In the present invention, an isolation vessel assembly comprises a vacuum sealed outer vessel, a vacuum sealed inner vessel, and an interior suspension assembly coupled between the outer and inner vessels for suspending the inner vessel within the outer vessel. A noise measurement system records thermal noise data from the isolation vessel assembly. A vacuum system creates a vacuum between an internal surface of the outer vessel and an external surface of the inner vessel. The present invention thus provides an acoustically quiet environment due to the vacuum created between the inner and outer vessels and a substantially vibration free environment due to the suspension assembly suspending the inner vessel within the outer vessel. The thermal noise in the microphone, effectively isolated according to the invention, can be accurately measured.

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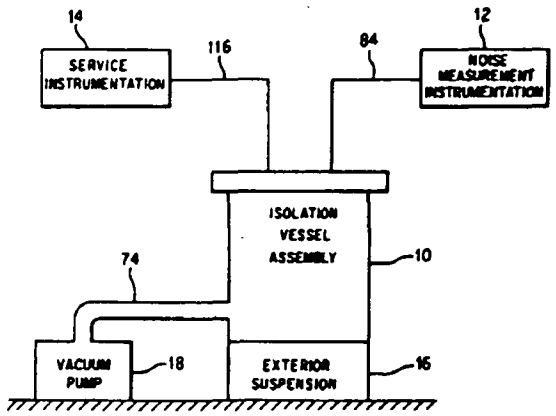

N92-33030* National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.

ARC/GAS ELECTRODE Patent

RICHARD M. POORMAN, inventor (to NASA) and JACK L. WEEKS, inventor (to NASA) 22 Sep. 1992 5 p Filed 29 Mar. 1991 Supersedes N91-25335 (29 - 17, p 2771) (NASA-CASE-MFS-29766-1; US-PATENT-5,149,932; US-PATENT-APPL-SN-677182; US-PATENT-CLASS-219-75; US-PATENT-CLASS-219-72; INT-PATENT-CLASS-B23K-9/24)

Avail: US Patent and Trademark Office

A gas/arc electrode is disclosed for use under vacuum conditions where a first housing encloses a second housing, with an end of the second housing extending through an opening in the first housing and having an outlet orifice. Provisions are made for circulating a coolant through the first housing to surround and cool the second housing. An electrical current and a gas, such as argon, as passed through the second housing, with the current flowing through a narrow stream of the ionized gas flowing through the outlet orifice to a workpiece to be treated. The second housing forms a chamber

which has a cross sectional area, in a plane perpendicular to the direction of gas flow, of at least ten times the cross sectional area of the outlet orifice such that a gas pressure can be maintained in the chamber to reduce erosion of the chamber walls.

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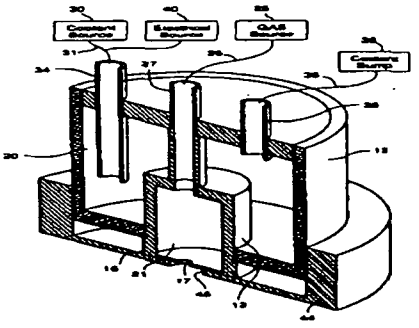

34
FLUID MECHANICS AND HEAT TRANSFER

Includes boundary layers; hydrodynamics; fluidics; mass transfer; and ablation cooling.

N92-28752* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

HEAT EXCHANGER WITH OSCILLATING FLOW Patent

STEPHEN J. SCOTTI, inventor (to NASA), MAX L. BLOSSER, inventor (to NASA), and CHARLES J. CAMARDA, inventor (to NASA) 28 Apr. 1992 11 p Filed 30 Mar. 1990 Supersedes N90-27072 (28 - 21, p 3004)

(NASA-CASE-LAR-14033-1; US-PATENT-5,107,920; US-PATENT-APPL-SN-501909; US-PATENT-CLASS-165-109.1; US-PATENT-CLASS-165-41; US-PATENT-CLASS-165-4; US-PATENT-CLASS-165-104.31; US-PATENT-CLASS-165-104.34; US-PATENT-CLASS-165-110; INT-PATENT-CLASS-F28D-17/00) Avail: US Patent and Trademark Office

Various heat exchange apparatuses are described in which an oscillating flow of primary coolant is used to dissipate an incident heat flux. The oscillating flow may be imparted by a reciprocating piston, a double action twin reciprocating piston, fluidic oscillators, or electromagnetic pumps. The oscillating fluid flows through at least one conduit in either an open loop or a closed loop. A secondary flow of coolant may be used to flow over the outer walls of at least one conduit to remove heat transferred from the primary coolant to the walls of the conduit.

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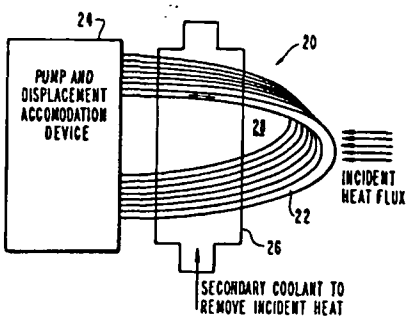

N92-29125* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

PULSE THERMAL ENERGY TRANSPORT/STORAGE SYSTEM Patent

MARK W. WEISLOGEL, inventor (to NASA) 7 Jul. 1992 11 p Filed 26 Jul. 1991 Supersedes N92-10167 (30 - 1, p 32)

(NASA-CASE-LEW-15235-1; US-PATENT-5,127,471; US-PATENT-APPL-SN-736145; US-PATENT-CLASS-165-104.22; US-PATENT-CLASS-165-41; US-PATENT-CLASS-165-104.14; US-PATENT-CLASS-417-209; INT-PATENT-CLASS-F28D-15/02) Avail: US Patent and Trademark Office

A pulse-thermal pump is described. The pump has a novel fluid flow wherein heat admitted to a closed system raises the pressure in a closed evaporator chamber, while another interconnected evaporator chamber remains open. This creates a pressure differential, and at a predetermined pressure, the closed evaporator is opened and the opened evaporator is closed. The difference in pressure initiates fluid flow in the system.

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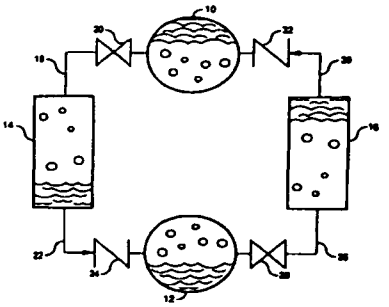


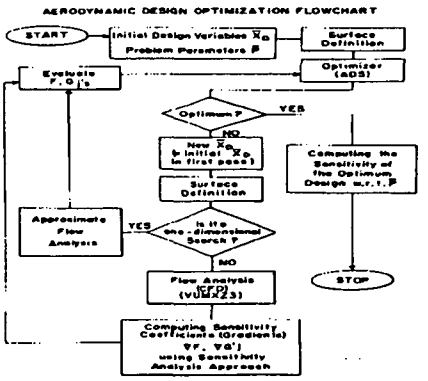
N92-29830*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

AERODYNAMIC DESIGN OPTIMIZATION USING SENSITIVITY ANALYSIS AND COMPUTATIONAL FLUID DYNAMICS Patent Application

OKTAY BAYSAL, inventor (to NASA) (Old Dominion Univ., Norfolk, VA.) and MOHAMAD E. ELESHAKY, inventor (to NASA) (Old Dominion Univ., Norfolk, VA.) 3 Jan. 1992 24 p (Contract NAG1-1188)

(NASA-CASE-LAR-14815-1-CU; NAS 1.71:LAR-14815-1-CU; US-PATENT-APPL-SN-820432) Avail: CASI HC A03/MF A01

An efficient aerodynamic shape optimization method based on a computational fluid dynamics/sensitivity analysis algorithm has been developed which determines automatically the geometrical definition of an optimal surface starting from any initial arbitrary geometry. This method is not limited to any number of design variables or to any class of surfaces for shape definition. NASA



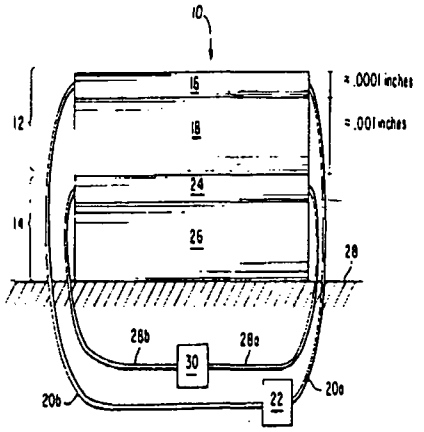
N92-29954*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

ACTIVE THERMAL ISOLATION FOR TEMPERATURE RESPONSIVE SENSORS Patent Application

SCOTT D. MARTINSON, inventor (to NASA), DAVID L. GRAY, inventor (to NASA), DEBRA L. CARRAWAY, inventor (to NASA), and DANIEL C. REDA, inventor (to NASA) 2 Jan. 1992 16 p (NASA-CASE-LAR-14612-1; NAS 1.71:LAR-14612-1;US-PATENT-APPL-SN-820431) Avail: CASI HC A03/MF A01

The detection of flow transition between laminar and turbulent flow and of shear stress or skin friction of airfoils is important in basic research for validation of airfoil theory and design. These values are conventionally measured using hot film nickel sensors deposited on a polyimide substrate. The substrate electrically insulates the sensor and underlying airfoil but is prevented from thermally isolating the sensor by thickness constraints necessary to avoid flow contamination. Proposed heating of the model surface is difficult to control, requires significant energy expenditures, and may alter the basic flow state of the airfoil. A temperature responsive sensor is located in the airflow over the specified surface of a body and is maintained at a constant temperature. An active thermal isolator is located between this temperature responsive sensor and the specific surface of the body. The total thickness of the isolator and sensor avoid any contamination of the flow. The temperature of this isolator is controlled to reduce conductive heat flow from the temperature responsive sensor to the body. This temperature control includes (1) operating the isolator at the same temperature as the constant temperature of the sensor; and (2) establishing a fixed boundary temperature which is either (a) less than or equal to or (b) slightly greater than the sensor constant temperature. The present invention accordingly thermally isolates a temperature responsive sensor in an energy efficient, controllable manner while avoiding any contamination of the flow.

NASA



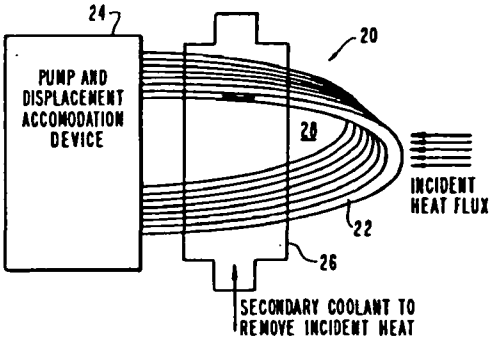
N92-30024*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

HEAT EXCHANGER WITH OSCILLATING FLOW Patent Application

STEPHEN J. SCOTTI, inventor (to NASA), MAX L. BLOSSER, inventor (to NASA), and CHARLES J. CAMARDA, inventor (to NASA) 24 Feb. 1992 21 p (NASA-CASE-LAR-14033-2; NAS 1.71:LAR-14033-2; US-PATENT-APPL-SN-843653) Avail: CASI HC A03/MF A01

Various heat exchange apparatuses are described in which an oscillating flow of primary coolant is used to dissipate an incident heat flux. The oscillating flow may be imparted by a reciprocating piston, a double action twin reciprocating piston, fluidic oscillators or electromagnetic pumps. The oscillating fluid flows through at least one conduit in either an open loop or a closed loop. A secondary flow of coolant may be used to flow over the outer walls of at least one conduit to remove heat transferred from the primary coolant to the walls of the conduit.

NASA



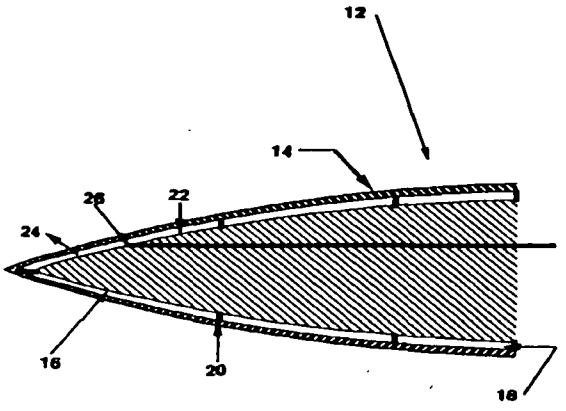
N92-30387*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

CONTROL AND AUGMENTATION OF PASSIVE POROSITY THROUGH TRANSPIRATION CONTROL Patent Application

DANIEL W. BANKS, inventor (to NASA), RICHARD M. WOOD, inventor (to NASA), and STEVEN X. S. BAUER, inventor (to NASA) 22 May 1992 11 p (NASA-CASE-LAR-14682-1; NAS 1.71:LAR-14682-1; US-PATENT-APPL-SN-887002) Avail: CASI HC A03/MF A01

A device for controlling pressure loading of a member caused by a fluid moving past the member or the member moving through a fluid is presented. The device consists of a porous skin mounted over the solid surface of the member and separated from the solid surface by a plenum. Fluid from an area exerting high pressure on the member may enter the plenum through the porous surface and exit into an area exerting a lower pressure on the member, thus, controlling pressure loading of the member. A transpirational control device controls the conditions within the plenum, thus, controlling the side force and yaw moment on the forebody.

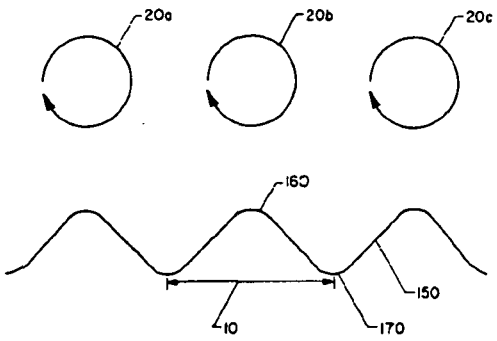
NASA



N92-30390*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
METHOD OF MEASURING CROSS-FLOW VORTICES BY USE OF AN ARRAY OF HOT-FILM SENSORS Patent Application
NAVAL K. AGARWAL, inventor (to NASA) (Analytical Services and Materials, Inc., Hampton, VA.), DAL V. MADDALON, inventor (to NASA), and SIVA M. MANGALAM, inventor (to NASA) (Analytical Services and Materials, Inc., Hampton, VA.) 7 Jan. 1991 15 p (NASA-CASE-LAR-14824-1-SB; NAS 1.71:LAR-14824-1-SB; US-PATENT-APPL-SN-823805) Avail: CASI HC A03/MF A01

The invention is a method for measuring the wavelength of cross-flow vortices of air flow having streamlines of flow traveling across a swept airfoil. The method comprises providing a plurality of hot-film sensors. Each hot-film sensor provides a signal which can be processed, and each hot-film sensor is spaced in a straight-line array such that the distance between successive hot-film sensors is less than the wavelength of the cross-flow vortices being measured. The method further comprises determining the direction of travel of the streamlines across the airfoil and positioning the straight-line array of hot film sensors perpendicular to the direction of travel of the streamlines, such that each sensor has a spanwise location. The method further comprises processing the signals provided by the sensors to provide root-mean-square values for each signal, plotting each root-mean-square value as a function of its spanwise location, and determining the wavelength of the cross-flow vortices by noting the distance between two maxima or two minima of root-mean-square values.

NASA



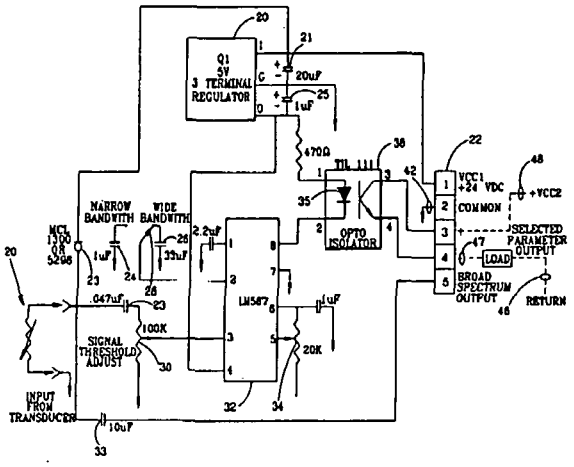
35
INSTRUMENTATION AND PHOTOGRAPHY

Includes remote sensors; measuring instruments and gages; detectors; cameras and photographic supplies; and holography.

N92-23545*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
SMART ACCELEROMETER Patent Application
RICHARD J. BOZEMAN, JR., inventor (to NASA) 12 Feb. 1992 16 p
(NASA-CASE-MSC-21951-1; NAS 1.71:MSC-21951-1; US-PATENT-APPL-SN-834451) Avail: CASI HC A03/MF A01

The invention discloses methods and apparatus for detecting vibrations from machines which indicate an impending malfunction for the purpose of preventing additional damage and allowing for an orderly shutdown or a change in mode of operation. The method and apparatus is especially suited for reliable operation in providing the electrical environment which is typically noisy and in which unrecognized ground loops may exist.

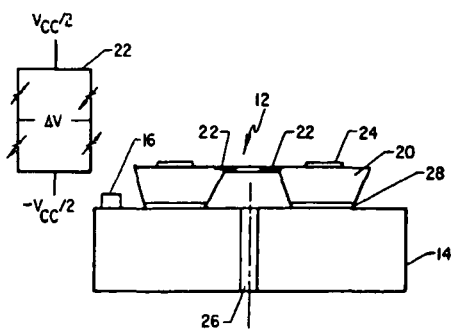
NASA



N92-29097* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
PRESSURE TRANSDUCER AND SYSTEM FOR CRYOGENIC ENVIRONMENTS Patent
JOHN J. CHAPMAN, inventor (to NASA) 26 May 1992 21 p Filed 23 Apr. 1991 Supersedes N91-28546 (29 - 20, p 3349) (NASA-CASE-LAR-14579-1; US-PATENT-5,116,331; US-PATENT-APPL-SN-690198; US-PATENT-CLASS-73-721; US-PATENT-CLASS-73-708; US-PATENT-CLASS-73-727; USPATENT-CLASS-73-756; US-PATENT-CLASS-338-4; INT-PATENT-CLASS-G01L-7/08; INT-PATENT-CLASS-G01L-9/06) Avail: US Patent and Trademark Office

A silicon pressure die is bonded to a borosilicate substrate above the pneumatic port. A Wheatstone bridge circuit is formed on the silicon pressure die and has bridge elements of silicon doped with boron to a deposit density level of approximately 1 x 10(exp 19)-10(exp 21) boron/cc. A current source is provided to excite the Wheatstone bridge circuit. In addition, a temperature sensor is provided to provide temperature readings. An array may be formed of the resulting pressure transducers. This unique solution of materials permits operation of a pressure transducer in cryogenic environments.

Official Gazette of the U.S. Patent and Trademark Office



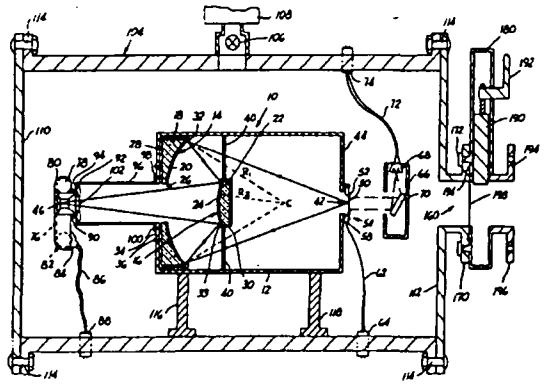
N92-29135* National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.

WATER WINDOW IMAGING X RAY MICROSCOPE Patent

RICHARD B. HOOVER, inventor (to NASA) 21 Apr. 1992 9 p Filed 31 Oct. 1990 Supersedes N91-15519 (29 - 7, p 1005) (NASA-CASE-MFS-28485-1; US-PATENT-5,107,526; US-PATENT-APPL-SN-606988; US-PATENT-CLASS-378-43; US-PATENT-CLASS-378-210; INT-PATENT-CLASS-G21K-7/00) Avail: US Patent and Trademark Office

A high resolution x ray microscope for imaging microscopic structures within biological specimens has an optical system including a highly polished primary and secondary mirror coated with identical multilayer coatings, the mirrors acting at normal incidence. The coatings have a high reflectivity in the narrow wave bandpass between 23.3 and 43.7 angstroms and have low reflectivity outside of this range. The primary mirror has a spherical concave surface and the secondary mirror has a spherical convex surface. The radii of the mirrors are concentric about a common center of curvature on the optical axis of the microscope extending from the object focal plane to the image focal plane. The primary mirror has an annular configuration with a central aperture and the secondary mirror is positioned between the primary mirror and the center of curvature for reflecting radiation through the aperture to a detector. An x ray filter is mounted at the stage end of the microscope, and film sensitive to x rays in the desired band width is mounted in a camera at the image plane of the optical system. The microscope is mounted within a vacuum chamber for minimizing the absorption of x rays in air from a source through the microscope.

Official Gazette of the U.S. Patent and Trademark Office



N92-29156* National Aeronautics and Space Administration. Pasadena Office, CA.

ULTRA-HIGH TEMPERATURE STABILITY JOULE-THOMSON COOLER WITH CAPABILITY TO ACCOMODATE PRESSURE VARIATIONS Patent

STEVEN BARD, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.), JIUNN-JENG WU, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.), and CURTIS A. TRIMBLE, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 9 Jun. 1992 8 p Filed 28 Dec. 1990

(NASA-CASE-NPO-18184-1-CU; US-PATENT-5,119,637; US-PATENT-APPL-SN-636076; US-PATENT-CLASS-62-51.2; US-PATENT-CLASS-62.224; INT-PATENT-CLASS-F25B-19/02) Avail: US Patent and Trademark Office

A Joule-Thomson cryogenic refrigeration system capable of achieving high temperature stabilities in the presence of varying temperature, atmospheric pressure, and heat load is provided. The Joule-Thomson cryogenic refrigeration system includes a demand flow Joule-Thomson expansion valve disposed in a cryostat of the refrigeration system. The expansion valve has an adjustable orifice that controls the flow of compressed gas therethrough and induces cooling and partial liquefaction of the gas. A recuperative heat exchanger is disposed in the cryostat and coupled to the expansion valve. A thermostatically self-regulating mechanism is disposed in the cryostat and coupled to the J-T expansion valve. The thermostatically self-regulating mechanism automatically adjusts the cross sectional area of the adjustable valve orifice in response to environmental temperature changes and changes in power dissipated at a cold head. A temperature sensing and adjusting mechanism is coupled to a cold head for adjusting the temperature of the cold head in response to the change in heat flow in the cold head. The temperature sensing and adjusting mechanism comprises a temperature sensitive diode, a wound wire heater, and an electrical feedback control circuit coupling the diode to the heater. An absolute pressure relief valve is interposed between the output of the cryostat and an exhaust port for maintaining a constant exhaust temperature in the refrigerating system, independent of the changes in atmospheric pressure.

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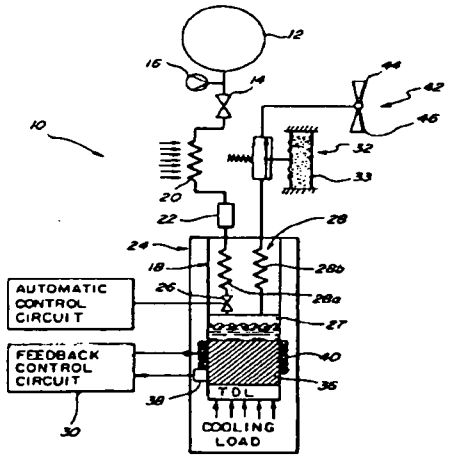


N92-29952*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.

ACCELEROMETER METHOD AND APPARATUS FOR INTEGRAL DISPLAY AND CONTROL FUNCTIONS Patent Application

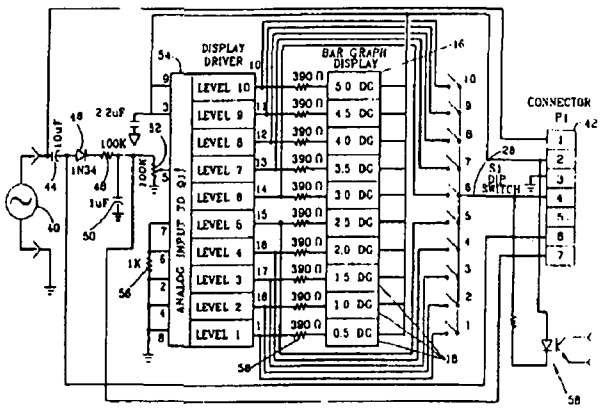
RICHARD J. BOZEMAN, JR., inventor (to NASA) 19 Jun. 1992 20 p

(NASA-CASE-MSC-21961-1; NAS 1.71:MSC-21961-1; US-PATENT-APPL-SN-901626) Avail: CASI HC A03/MF A01

Vibration analysis has been used for years to provide a determination of the proper functioning of different types of machinery, including rotating machinery and rocket engines. A determination of a malfunction, if detected at a relatively early stage in its development, will allow changes in operating mode or a sequenced shutdown of the machinery prior to a total failure. Such preventative measures result in less extensive and/or less expensive repairs, and can also prevent a sometimes catastrophic failure of equipment. Standard vibration analyzers are generally rather complex, expensive, and of limited portability. They also usually result in displays and controls

being located remotely from the machinery being monitored. Consequently, a need exists for improvements in accelerometer electronic display and control functions which are more suitable for operation directly on machines and which are not so expensive and complex. The invention includes methods and apparatus for detecting mechanical vibrations and outputting a signal in response thereto. The apparatus includes an accelerometer package having integral display and control functions. The accelerometer package is suitable for mounting upon the machinery to be monitored. Display circuitry provides signals to a bar graph display which may be used to monitor machine condition over a period of time. Control switches may be set which correspond to elements in the bar graph to provide an alert if vibration signals increase over the selected trip point. The circuitry is shock mounted within the accelerometer housing. The method provides for outputting a broadband analog accelerometer signal, integrating this signal to produce a velocity signal, integrating and calibrating the velocity signal before application to a display driver, and selecting a trip point at which a digitally compatible output signal is generated. The benefits of a vibration recording and monitoring system with controls and displays readily mountable on the machinery being monitored and having capabilities described will be appre ciated bythose working in the art.

NASA



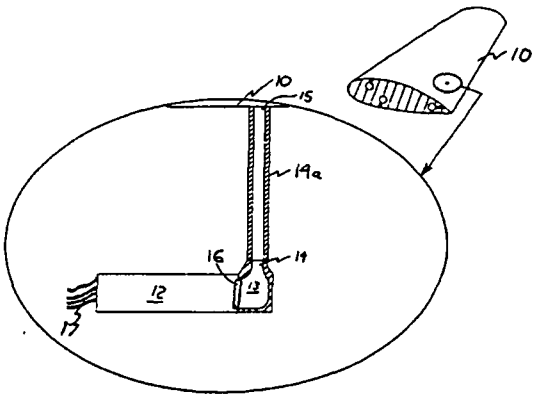
N92-30030*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

CALIBRATION APPARATUS FOR RECESS MOUNTED PRESSURE TRANSDUCERS Patent Application

MICHAEL A. MARCOLINI, inventor (to NASA), WILLIAM T. MILLER, JR., inventor (to NASA), ROBERT A. BAALS, inventor (to NASA), and RUTH M. MARTIN, inventor (to NASA) 29 Apr. 1992 25 p (NASA-CASE-LAR-14724-1; NAS 1.71:LAR-14724-1; US-PATENT-APPL-SN-876592) Avail: CASI HC A03/MF A01

Measurement of surface pressure fluctuations is important in aerodynamic studies and is conventionally accomplished via thin surface mounted transducers. These transducers contaminate the airflow, leading to the use of transducers located beneath the surface and communicating thereto via a pipette. This solution creates its own problem of transducer calibration due to the structure of the pipette. A calibration apparatus and method for calibrating a pressure transducer are provided. The pressure transducer is located within a test structure having a pipette leading from an outer structure surface to the pressure transducer. The calibration apparatus defines an acoustic cavity. A first end of the acoustic cavity is adapted to fluidly communicate with the pipette leading to the pressure transducer, wherein a channel is formed from the acoustic cavity to the transducer. An acoustic driver is provided for acoustically exciting fluid in the acoustic cavity to generate pressure waves which propagate to the pressure transducer. A pressure sensing microphone is provided for sensing the pressure fluctuations in the cavity near the cavity end, whereby this sensed pressure is compared with a simultaneously pressure sensed by the pressure transducer to permit calibration of the pressure transducer sensings. Novel aspects of the present invention include its use of a calibration apparatus to permit in-situ calibration of recess mounted pressure transducers.

NASA



N92-31790* National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.

HOLLOW FIBER CLINOSTAT FOR SIMULATING MICROGRAVITY IN CELL CULTURE Patent

PERCY H. RHODES, inventor (to NASA), TERESA Y. MILLER, inventor (to NASA), and ROBERT S. SNYDER, inventor (to NASA) 14 Apr. 1992 5 p Filed 28 Jul. 1989 Supersedes N89-28793 (27 - 23, p 3294)
(NASA-CASE-MFS-28370-1; US-PATENT-5,104,802; US-PATENT-APPL-SN-386175; US-PATENT-CLASS-435-286; US-PATENT-CLASS-435-311; US-PATENT-CLASS-435-312; INT-PATENT-CLASS-C12M-3/02; INT-PATENT-CLASS-C12M-3/00; INT-PATENT-CLASS-C12M-1/12; INT-PATENT-CLASS-C12M-1/10)
Avail: US Patent and Trademark Office

A clinostat for simulating microgravity on cell systems carried in a fiber fixedly mounted in a rotatable culture vessel is disclosed. The clinostat is rotated horizontally along its longitudinal axis to simulate microgravity or vertically as a control response. Cells are injected into the fiber and the ends of the fiber are sealed and secured to spaced end pieces of a fiber holder assembly which consists of the end pieces, a hollow fiber, a culture vessel, and a tension spring with three alignment pins. The tension spring is positioned around the culture vessel with its ends abutting the end pieces for alignment of the spring. After the fiber is secured, the spring is decompressed to maintain tension on the fiber while it is being rotated. This assures that the fiber remains aligned along the axis of rotation. The fiber assembly is placed in the culture vessel and culture medium is

added. The culture vessel is then inserted into the rotatable portion of the clinostat and subjected to rotate at selected rpms. The internal diameter of the hollow fiber determines the distance the cells are from the axis of rotation.

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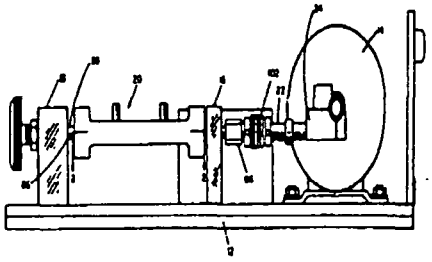

N92-33010* National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.

ROTATING-UNBALANCED-MASS DEVICES AND METHODS FOR SCANNING BALLOON-BORNE-EXPERIMENTS, FREE-FLYING SPACECRAFT, AND SPACE SHUTTLE/SPACE STATION ATTACHED EXPERIMENTS Patent

MICHAEL E. POLITES, inventor (to NASA) 14 Jul. 1992 14 p Filed 23 May 1990 Supersedes N90-26304 (28 - 20, p 2866) (NASA-CASE-MFS-28425-1; US-PATENT-5,129,600; US-PATENT-APPL-SN-527462; US-PATENT-CLASS-244-158R; US-PATENT-CLASS-74-61;US-PATENT-CLASS-74-87;US-PATENTCLASS-343-766;INT-PATENT-CLASS-B64G-1/66)

Avail: US Patent and Trademark Office

A method and apparatus for scanning balloon-borne experiments, free-flying spacecraft, or gimballed experiments mounted on a space shuttle or space station, makes use of one or more rotating unbalanced mass devices for selectively generating circular, line, or raster scan patterns for the experiment line of sight. An auxiliary control system may also be used in combination with the rotating unbalanced mass device, for target acquisition, keeping the scan centered on the target, or for producing complementary motion for raster scanning. The rotating unbalanced mass makes use of a mass associated with a drive shaft, such mass having a center of gravity which is displaced from the drive shaft rotation axis. The drive shaft is driven with a substantially constant angular velocity, thereby resulting in relatively low power requirements since no acceleration or deceleration of the mass is generally involved during steady state operations. The resulting centrifugal force of the rotating unbalanced mass is used to generate desired reaction forces on the experiment or spacecraft to create a desired scan pattern for the experiment line of sight.

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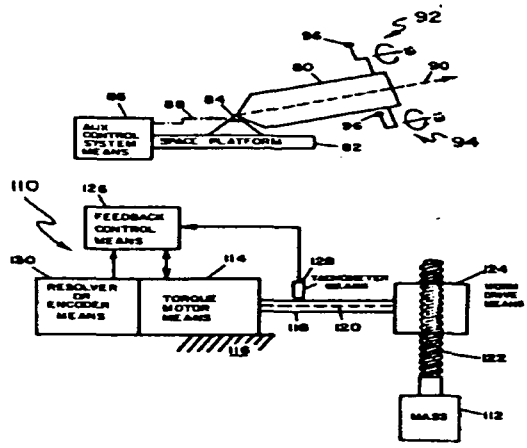

N92-33016* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

PASSIVE FETAL MONITORING SENSOR Patent

ALLAN J. ZUCKERWAR, inventor (to NASA), EARL T. HALL, inventor (to NASA), DONALD A. BAKER, inventor (to NASA), and TIMOTHY D. BRYANT, inventor (to NASA) 25 Aug. 1992 8 p Filed 16 Jul. 1990 Supersedes N91-13686 (29 - 5, p 663) (NASA-CASE-LAR-14088-1-CU; US-PATENT-5,140,992; US-PATENT-APPL-SN-552670; US-PATENT-CLASS-128-715; US-PATENT-CLASS-128-775; INT-PATENT-CLASS-A61B-5/02) Avail: US Patent and Trademark Office

An ambulatory, passive sensor for use in a fetal monitoring system is discussed. The invention is comprised of a piezoelectric polymer film, combined with a metallic mounting plate fastened to a belt, and electrically connected to a signal processing unit by means of a shielded cable. The purpose of the sensor is to receive pressure pulses emitted by a fetus inside an expectant mother. Additionally, the monitor will filter out pressure pulses arising from other sources, such as the maternal heart.

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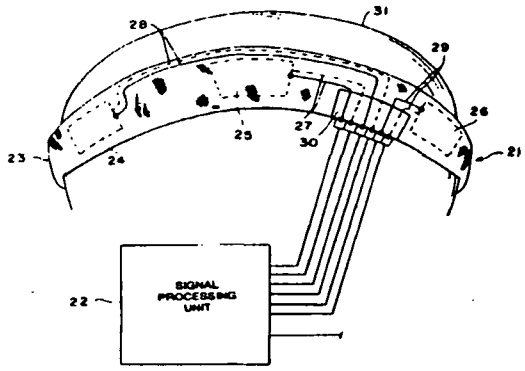

N92-33614* National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.

SUB-KELVIN RESISTANCE THERMOMETER Patent

STEPHEN H. CASTLES, inventor (to NASA) 25 Aug. 1992 8 p Filed 24 Sep. 1991 Supersedes N92-23460 (30 - 14, p 2378) (NASA-CASE-GSC-13406-1; US-PATENT-5,141,334; US-PATENT-APPL-SN-765070; US-PATENT-CLASS-374-178; US-PATENT-CLASS-374-185; US-PATENT-CLASS-357-28; US-PATENT-CLASS-338-22SD; US-PATENT-CLASS-338-25; INT-PATENT-CLASS-G01K-7/16; INT-PATENT-CLASS-G01K-7/00)

Avail: US Patent and Trademark Office

A device capable of accurate temperature measurement down to 0.01 K of a particular object is discussed. The device is comprised of the following: a heat sink wafer; a first conducting pad bonded near one end of the heat sink wafer; a second conducting pad bonded near the other end of the heat sink wafer; and an oblong doped semiconductor crystal such as germanium. The oblong doped semiconductor crystal has a third conducting pad bonded on its bottom surface with the oblong doped semiconductor crystal bonded to the heat sink wafer by having the fourth conducting pad bonded to the first conducting pad. A wire is bonded between the second and third

conducting pads. Current and voltage wires bonded to the first and second conducting pads measure the change in resistance of the oblong doped semiconductor crystal; this indicates the temperature of the object whose temperature is to be measured.

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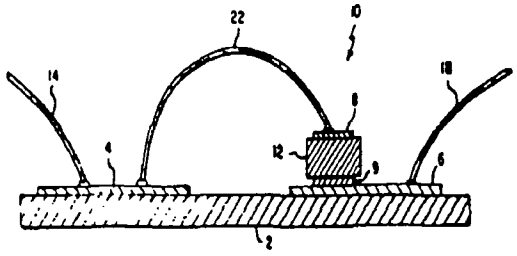

36
LASERS AND MASERS

Includes parametric amplifiers.

N92-31788* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
METHOD AND CIRCUIT FOR CONTROLLING THE EVOLUTION TIME INTERVAL OF A LASER OUTPUT PULSE Patent
NORMAN P. BARNES, inventor (to NASA) 7 Jul. 1992 6 p Filed 31 May 1989 Supersedes N89-28816 (27 - 23, p 3298) (NASA-CASE-LAR-13772-1; US-PATENT-5,128,949; US-PATENT-APPL-SN-359460; US-PATENT-CLASS-372-25; US-PATENT-CLASS-372-30; INT-PATENT-CLASS-H01S-3/10) Avail: US Patent and Trademark Office

The invention is a method and circuit for controlling the evolution time interval of a laser output pulse used for making precise spectral measurements. It comprises the means for pumping a laser medium in a resonator that includes a Q-switch and polarizer that act in combination to control the loss in the resonator. A photodiode senses the resulting fluorescence which is applied to a two level Q-switch and polarizer from high to intermediate to substantially zero loss states to control the evolution time interval of the resulting laser output pulse.

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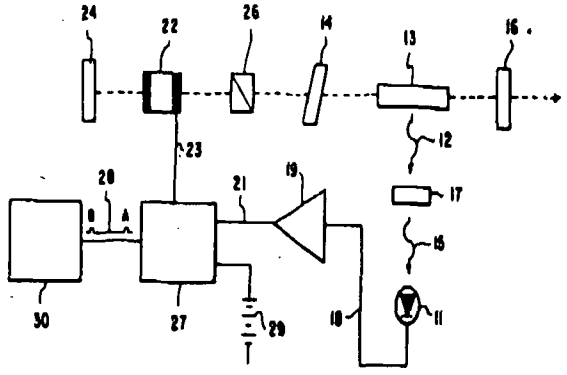


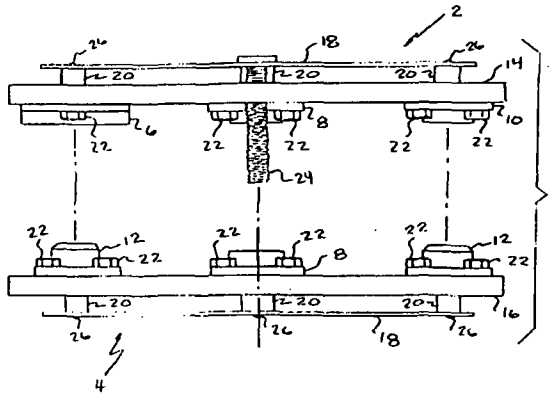
37
MECHANICAL ENGINEERING

Includes auxiliary systems (nonpower); machine elements and processes; and mechanical equipment.

N92-23377*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
HIGH RELIABILITY ROBOT FRIENDLY ORU INTERFACE Patent Application
GEORGE M. VOELLMER, inventor (to NASA) 7 Oct. 1991 25 p (NASA-CASE-GSC-13360-1; NAS 1.71:GSC-13360-1; US-PATENT-APPL-SN-772200) Avail: CASI HC A03/MF A01

Presented here is a robot friendly coupling device for an orbital replacement unit (ORU). The invention will provide a coupling that is detached and attached remotely by a robot. The design of the coupling must allow for slight misalignments, over-torque protection, and precision placement. This is accomplished by means of a triangular interface comprising three components. A base plate assembly is located on an attachment surface, such as a satellite. The base plate assembly has a cup member, a slotted member, and a post member. The ORU that the robot attaches to the base plate assembly has an ORU plate assembly with two cone members and a post member which mate to the base plate assembly. As the two plates approach one another, one cone member of the ORU plate assembly has to be placed accurately enough to fall into the cup member of the base plate assembly. The cup member forces alignment until a second cone falls into a slotted member which provides final alignment. A single bolt is used to attach the two plates. Two deflecting plates are attached to the backs of the plates. When pressure is applied to the center of the deflecting plates, the force is distributed preventing the ORU and base plates from deflecting. This accounts for precision in the placement of the article. The novelty is believed to reside in using deflecting plates in conjunction with kinematic mounts to provide distributed forces to the two members.

NASA



N92-23378*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
RETRACTABLE TOOL BIT HAVING LATCH TYPE CATCH MECHANISM Patent Application
GEORGE VOELLMER, inventor (to NASA) 22 Nov. 1991 15 p (NASA-CASE-GSC-13359-1; NAS 1.71:GSC-13359-1; US-PATENT-APPL-SN-796496) Avail: CASI HC A03/MF A01

A retractable tool bit assembly for a tool such as an allen key is presented. The assembly includes one or more spring loaded nestable or telescoping tubular sections together with a catch mechanism for capturing and holding the tool in its retracted position. The catch

mechanism consists of a latch mechanism located in a base section and which engages a conically shaped tool head located at the inner end of the tool. The tool head adjoins an eccentric oval type neck portion which extends to a rear lip of the tool head. The latch mechanism releases when the ovular neck portion rotates about the catch members upon actuation of a rotary tool drive motor. When released, all the telescoping sections and the tool extends fully outward to a use position.

NASA

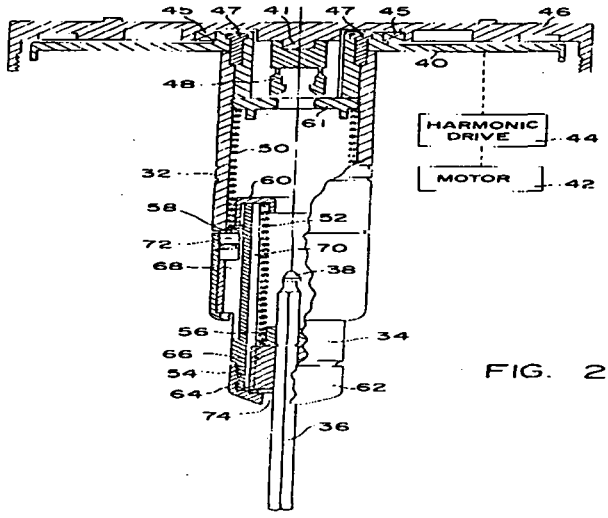


FIG. 2

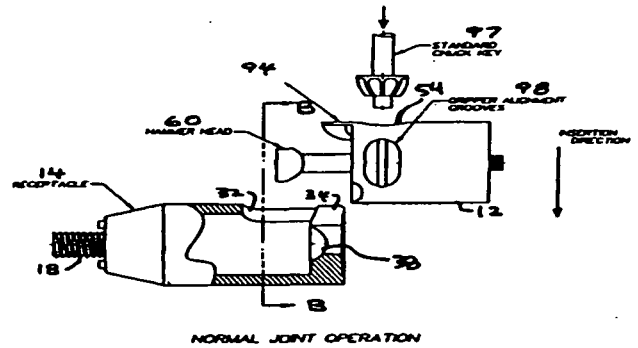
N92-23544*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.

ROBOT-FRIENDLY CONNECTOR Patent Application

GEORGE F. PARMA, inventor (to NASA), MARK H. VANDEBERGHE, inventor (to NASA), and STEVE C. RUIZ, inventor (to NASA) (Lockheed Corp., Houston, TX.) 26 Nov. 1991 32 p (NASA-CASE-MSC-21864-1; NAS 1.71:MSC-218641; US-PATENT-APPL-SN-799460) Avail: CASI HC A03/MF A01

Robot friendly connectors, which, in one aspect are truss joints with two parts, a receptacle and a joint, the joint having a head which is loosely inserted into the receptacle and is then tightened and aligned; in one aspect, the head is a rounded hammerhead which initially is enclosed in the receptacle with sloppy fit provided by the shape, size and configuration of surfaces on the head and on the receptacle.

NASA



NORMAL JOINT OPERATION

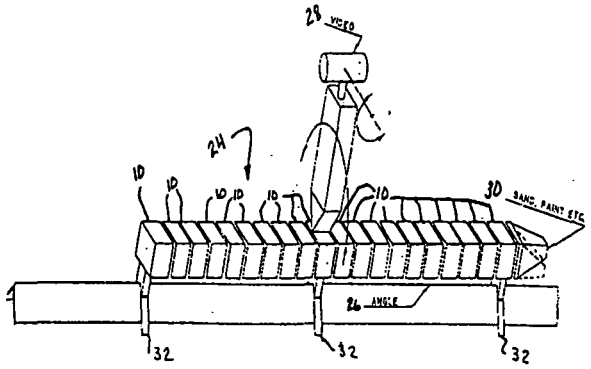
N92-23547*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.

CLIMBING ROBOT Patent Application

JAMES KERLEY, inventor (to NASA), EDWARD MAY, inventor (to NASA), and WAYNE ECKLUND, inventor (to NASA) 10 Feb. 1992 35 p (NASA-CASE-GSC-13442-1; NAS 1.71:GSC-13442-1; US-PATENT-APPL-SN-843861) Avail: CASI HC A03/MF A01

A mobile robot for traversing any surface consisting of a number of interconnected segments, each interconnected segment having an upper 'U' frame member, a lower 'U' frame member, a compliant joint between the upper 'U' frame member and the lower 'U' frame member, a number of linear actuators between the two frame members acting to provide relative displacement between the frame members, a foot attached to the lower 'U' frame member for adherence of the segment to the surface, an inter-segment attachment attached to the upper 'U' frame member for interconnecting the segments, a power source connected to the linear actuator, and a computer/controller for independently controlling each linear actuator in each interconnected segment such that the mobile robot moves in a caterpillar like fashion.

NASA



N92-23548*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.

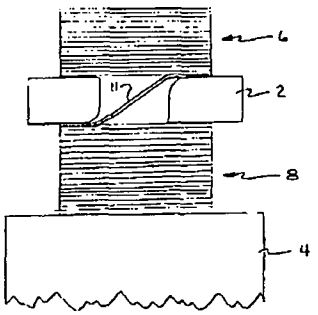
HELIX TRANSLATION DEVICE Patent Application

M. BRUCE MILAM, inventor (to NASA) and PHILIP STUDER, inventor (to NASA) 4 Sep. 1991 21 p (NASA-CASE-GSC-13141-1; NAS 1.71:GSC-13141-1; US PATENT-APPL-SN-754875) Avail: CASI HC A03/MF A01

This invention places a single flat shim, wound into a helical coil, above and below an object to be moved which has a 'transition area' between its upper and lower surface. This 'transition area' allows the helix shim to 'transition' from the top surface of the object to the bottom surface of the object. The 'transition' of the shim is to be accomplished by holding the object steady and rotating the helix shim. When the helix shim is rotated clockwise, the shim will 'transition' from the upper surface of the object to the lower surface of the object at a rate of one shim thickness for every 360 degrees of rotation. The object will then be raised by very fine increments. The invention is a unique rotary to linear motion device capable of

continuously variable output displacement and restraint of large loads. The load capacity is large because it relies on compressive rather than shear strength. A continuous rather than incremental output is provided.

NASA



N92-23553*# National Aeronautics and Space Administration. Pasadena Office, CA.

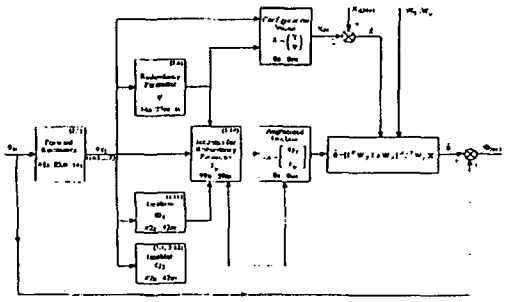
CONFIGURATION CONTROL OF SEVEN-DEGREE-OF FREEDOM ARMS Patent Application

HOMAYOUN SERAJI, inventor (to NASA), MARK K. LONG, inventor (to NASA), and THOMAS S. LEE, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 11 Mar. 1992 47 p (Contract NAS7-918)

(NASA-CASE-NPO-18607-1-CU; NAS 1.71:NPO-18607-1-CU; US-PATENT-APPL-SN-849629) Avail: CASI HC A03/MF A01

A seven degree of freedom robot arm with a six degree of freedom end effector is controlled by a processor employing a 6 by 7 Jacobian matrix for defining location and orientation of the end effector in terms of the rotation angles of the joints, a 1 (or more) by 7 Jacobian matrix for defining 1 (or more) user specified kinematic functions constraining location or movement of selected portions of the arm in terms of the joint angles, the processor combining the two Jacobian matrices to produce an augmented 7 (or more) by 7 Jacobian matrix, the processor effecting control by computing in accordance with forward kinematics from the augmented 7 by 7 Jacobian matrix and from the seven joint angles of the arm a set of seven desired joint angles for transmittal to the joint servo loops of the arm. One of the kinematic functions constraints the orientation of the elbow plane of the arm. Another one of the kinematic functions minimizes a sum of gravitational torques on the joints. Still another kinematic function constrains the location of the arm to perform collision avoidance. Generically, one kinematic function minimizes a sum of selected mechanical parameters of at least some of the joints associated with weighting coefficients which may be changed during arm movement. The mechanical parameters may be velocity errors or gravity torques associated with individual joints.

NASA



N92-24042*# National Aeronautics and Space Administration. Pasadena Office, CA.

CONTROLLING FLEXIBLE ROBOT ARMS USING A HIGH SPEED DYNAMICS PROCESS Patent Application

ABHINANDAN JAIN, inventor (to NASA) and GUILLERMO RODRIGUEZ, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 3 Apr. 1992 65 p (Contract NAS7-918)

(NASA-CASE-NPO-18499-1-CU; NAS 1.71:NPO-18499-1-CU; US-PATENT-APPL-SN-862861) Avail: CASI HC A04/MF A01

Described here is a robot controller for a flexible manipulator arm having plural bodies connected at respective movable hinges, and flexible in plural deformation modes. It is operated by computing articulated body qualities for each of the bodies from the respective modal spatial influence vectors, obtaining specified body forces for each of the bodies, and computing modal deformation accelerations of the nodes and hinge accelerations of the hinges from the specified body forces, from the articulated body quantities and from the modal spatial influence vectors. In one embodiment of the invention, the controller further operates by comparing the accelerations thus computed to desired manipulator motion to determine a motion discrepancy, and correcting the specified body forces so as to reduce the motion discrepancy. The manipulator bodies and hinges are characterized by respective vectors of deformation and hinge configuration variables. Computing modal deformation accelerations and hinge accelerations is carried out for each of the bodies, beginning with the outermost body by computing a residual body force from a residual body force of a previous body, computing a resultant hinge acceleration from the body force, and then, for each one of the bodies beginning with the innermost body, computing a modal body acceleration from a modal body acceleration of a previous body, computing a modal deformation acceleration and hinge acceleration from the resulting hinge acceleration and from the modal body acceleration.

NASA

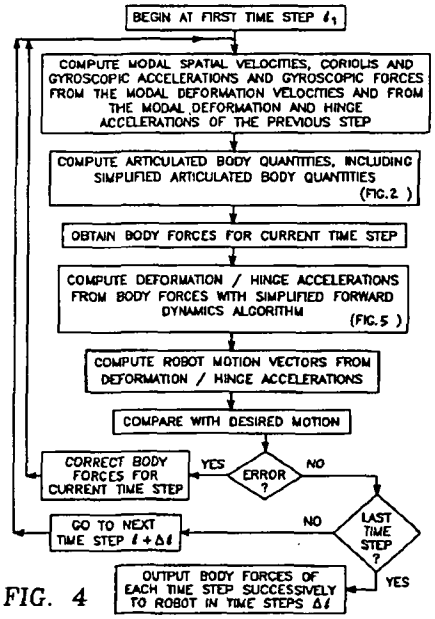


FIG. 4

N92-24043*# National Aeronautics and Space Administration. Pasadena Office, CA.

CONTROLLING UNDER-ACTUATED ROBOT ARMS USING A HIGH SPEED DYNAMICS PROCESS Patent Application

ABHINANDAN JAIN, inventor (to NASA) and GUILLERMO RODRIGUEZ, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 3 Apr. 1992 41 p

(Contract NAS8-918)
(NASA-CASE-NPO-18498-1-CU; NAS 1.71:NPO-18498-1-CU; US-PATENT-APPL-SN-866779) Avail: CASI HC A03/MF A01

The invention controls an under-actuated manipulator by first obtaining predetermined active joint accelerations of the active joints and the passive joint friction forces of the passive joints, then computing articulated body qualities for each of the joints from the current positions of the links, and finally computing from the articulated body qualities and from the active joint accelerations and the passive joint forces, active joint forces of the active joints. Ultimately, the invention transmits servo commands to the active joint forces thus computed to the respective ones of the joint servos. The computation of the active joint forces is accomplished using a recursive dynamics algorithm. In this computation, an inward recursion is first carried out for each link, beginning with the outermost link in order to compute the residual link force of each link from the active joint acceleration if the corresponding joint is active, or from the known passive joint force if the corresponding joint is passive. Then, an outward recursion is carried out for each link in which the active joint force is computed from the residual link force if the corresponding joint is active or the passive joint acceleration is computed from the residual link force if the corresponding joint is passive.

NASA

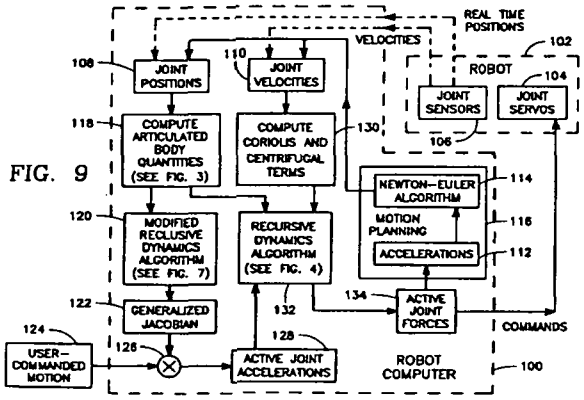


FIG. 9

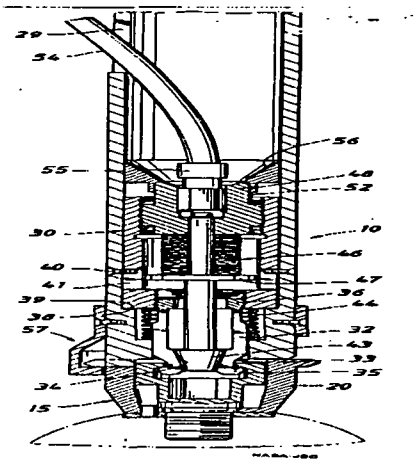
N92-24051*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.

QUICK-CONNECT FASTENERS FOR ASSEMBLING DEVICES IN SPACE Patent Application

CLARENCE J. WESSELSKI, inventor (to NASA), ERIK E. EVENSON, inventor (to NASA), and STEVE L. RUIZ, inventor (to NASA) (Lockheed Corp., Houston, TX.) 15 Jan. 1992 27 p
(NASA-CASE-MSC-21648-1; NAS 1.71:MSC-21648-1; US-PATENT-APPL-SN-824806) Avail: CASI HC A03/MF A01

A quick-connect fastener of a relatively-simple straightforward design is arranged with a tubular body adapted to be engaged against an attachment fitting in coincidental alignment with an opening in that fitting. A tubular collet having flexible finger projecting from its forward end is arranged in the fastener body to be shifted forwardly by an elongated expander member coaxially arranged within the tubular collet for advancing the collet fingers into the opening in the attachment fitting. Biasing means are arranged between the elongated expander member and a rotatable actuator which is threadedly mounted within the tubular collet so as to be rotated for urging the expander member into engagement with the collet fingers. A first coupling member is arranged on the rotatable actuator to be accessible from outside of the fastener so that a second coupling member on the distal end of a flexible shaft can be introduced into the fastener body and coupled to the first coupling member to enable a typical actuating tool coupled to the shaft outside of the fastener body to be operated for advancing the outwardly-enlarged ends of the collet fingers into the opening in the attachment fitting and thereafter rotating the actuator member to expand the fingers to that attachment fitting. Upon expansion of the collet fingers, the biasing means impose a biasing force on the expander to releasably retain the fingers in their latching positions.

NASA



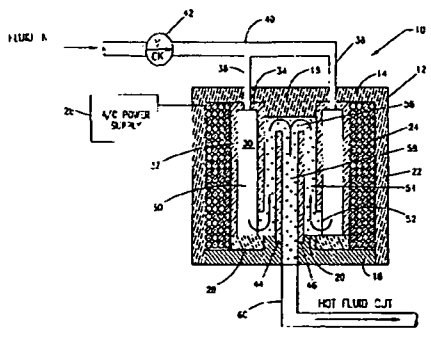
N92-24055*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.

INDUCTION BOILER Patent Application

GLEN A. ROBERTSON, inventor (to NASA) 27 Jan. 1992 13 p
(NASA-CASE-MFS-28634-1; NAS 1.71:MFS-28634-1; US-PATENT-APPL-SN-825895) Avail: CASI HC A03/MF A01

The invention is directed to a high temperature boiler which utilizes an inductively heated porous, metallic material in which hot fluids or gasses are produced. The invention utilizes an induction coil surrounding the porous, metallic material, and a chamber which contains both the metallic material and the fluid to be heated. An alternating current is passed through the coil as to establish eddy currents in the porous metallic material. The eddy currents create heat within the porous metallic material. This heat is conducted to the fluid as it passes through the porous metallic material.

NASA



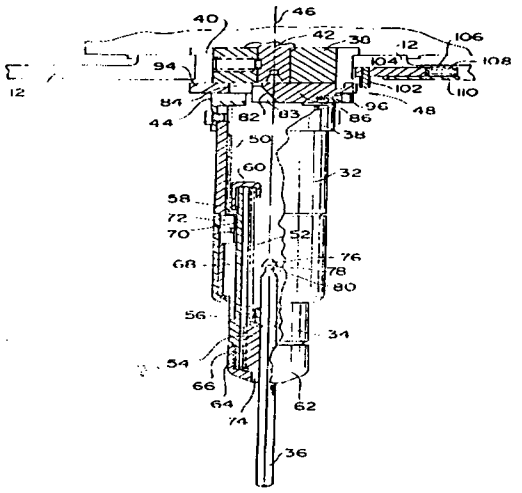
N92-24058*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.

RETRACTABLE TOOL BIT HAVING SLIDER TYPE CATCH MECHANISM Patent Application

GEORGE VOELLMER, inventor (to NASA) 24 Sep. 1991 14 p (NASA-CASE-GSC-13358-1; NAS 1.71:GSC-13358-1; US-PATENT-APPL-SN-765069) Avail: CASI HC A03/MF A01

A retractable tool bit assembly utilized in connection with a robotic gripper type end-effector is presented. The apparatus includes one or more spring loaded nestable or telescoping tubular sections together with a catch mechanism for capturing and holding the toll, such as an allen key, in its retracted position. The innermost tubular section includes a threshold cap and engages and holds the tool. The catch mechanism consists of a slider type mechanism located adjacent a relatively larger outer base section and includes means for engaging a conically or mushroom shaped rear end portion of the tool when the telescoping sections are moved to a retracted or parked position. The catch mechanism is released upon actuation of a rotary tool drive motor coupled to a circular mount and which holds the base section. When released all the telescoping sections including the tool extends fully outward to a use position.

NASA



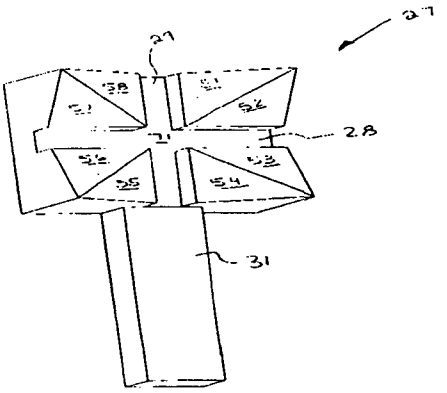
N92-24243*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.

DOUBLE-V BLOCK FINGERS WITH CRUCIFORM RECESS Patent Application

GEORGE M. VOELLMER, inventor (to NASA) 16 Sep.1991 22p (NASA-CASE-GSC-13356-1; NAS 1.71:GSC-13356-1; US-PATENT-APPL-SN-760634) Avail: CASI HC A03/MF A01

In a robot having a gripper including a pair of fingers and a drive motor for driving the fingers toward and away from one another while the fingers remain parallel to each other, the fingers consist of finger pads, which interface with a handle on an object to be grasped, and a shank, which attaches the fingers to the robot gripper. The double V finger has two orthogonal V grooves forming in the center of the finger pads and a recessed cruciform. The double V finger is used with a handle on the object to be grasped which is the negative of the finger pads. The handle face consists of V shaped pads capped with a rectangular cruciform. As the gripper is brought into place near the handle, the finger pads are lined up facing the handle pads. When the finger pads and the handle are in proper alignment, the rectangular ridges on the handle fall inside the rectangular grooves on the finger, and the grip is complete.

NASA



N92-28727* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.

PAYLOAD RETENTION DEVICE Patent

LEO G. MONFORD, JR., inventor (to NASA) 30 Jun. 1992 19 p Filed 26 Dec. 1991 (NASA-CASE-MSC-21906-1; US-PATENT-5,125,601; US-PATENT-APPL-SN-813558; US-PATENT-CLASS-244-161; US-PATENT-CLASS-294-65.5; US-PATENT-CLASS-294-86.4; US-PATENT-CLASS-901-30; US-PATENT-CLASS-901-46; INT-PATENT-CLASS-B64G-1/62) Avail: US Patent and Trademark Office

A payload retention device for grappling and retaining a payload in docked position on a supporting structure in the cargo bay of a space vehicle is presented. The device comprises a two-fault tolerant electromagnetic grappling system comprising electromagnets for attracting and grappling a grapple strike plate affixed to the payload when in proximity thereto and an electromechanical latching assembly comprising a pair of independent latching subassemblies. Each subassembly comprises a set of latching pawls which are driven into latching and unlatching positions relative to a grappled payload by a pair of gearmotors, each equipped with a ratchet clutch drive mechanism which is two-fault tolerant with respect to latching such that only one gearmotor of the four needs to be operational to effect a latch of the payload but is single fault tolerant with respect to release of a latched payload. Sensors are included for automatically sensing the magnetic grappling of a payload and for automatically de-energizing the gearmotors of the latching subassemblies when a latch condition is achieved.

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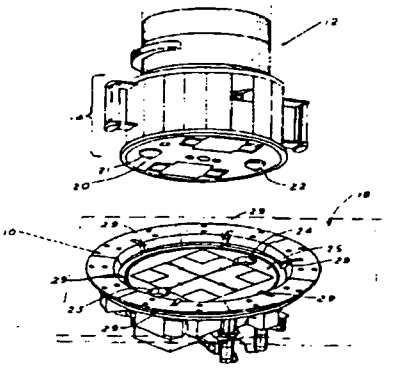

N92-28754* National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.

DEVICE FOR APPLYING CONSTANT PRESSURE TO A SURFACE Patent

EVE M. ABRAMS, inventor (to NASA) 3 Dec. 1991 5 p Filed 31 May 990 Supersedes N91-13734 (29 - 5, p 672)

(NASA-CASE-GSC-13230-1; US-PATENT-5,068,951; US-PATENT-APPL-SN-531374; US-PATENT-CLASS-29-110.5; US-PATENT-CLASS-29-123; US-PATENT-CLASS-29-132; US-PATENT-CLASS-15-230.11; INT-PATENT-CLASS-B05C-17/02) Avail: US Patent and Trademark Office

A device for applying constant pressure to a surface is disclosed. The device includes a cylinder having a longitudinal axis greater than the diameter of the cylinder. A first wheel and a second wheel are coupled to each end, respectively, of the cylinder. The wheels have a diameter substantially greater than the diameter of the cylinder. An elastomeric covering surrounds the cylinder. The elastomeric covering has an outer diameter substantially greater than the diameter of the wheels. A handle is coupled to the wheels for rolling and applying pressure to the elastomeric covering.

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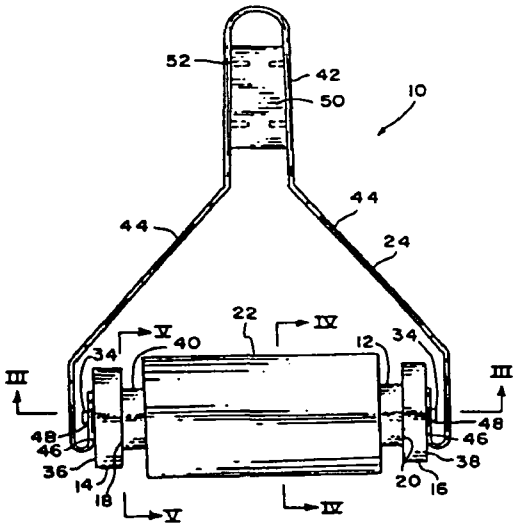

N92-29092* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

REMOVABLE HAND HOLD Patent

ROBERT D. CORRIGAN, inventor (to NASA) and ROBERT L. HAUER, inventor (to NASA) 30 Jun. 1992 9 p Filed 15 Apr. 1991 Supersedes N91-26543 (29 - 18, p 2995)

(NASA-CASE-LEW-15196-1; US-PATENT-5,126,131; US-PATENT-APPL-SN-687606; US-PATENT-CLASS-16-114R; US-PATENT-CLASS-248-222.1; US-PATENT-CLASS-248-251; US-PATENT-CLASS-256-59; US-PATENT-CLASS-16-111R; INT-PATENT-CLASS-A47H-1/144) Avail: US Patent and Trademark Office

A hand hold utilizes joining means which comprises two different mounting brackets that are permanently fastened to a supporting structure. An alignment/capture bracket is disposed at one end of the hand rail or hand hold which mates with one of the mounting brackets. A securing bracket is disposed at the opposite end of the hand rail/hand hold which connects with the other mounting bracket by means of a locking device. The alignment/capture bracket has a central tapered tongue with two matching slots disposed on each side.

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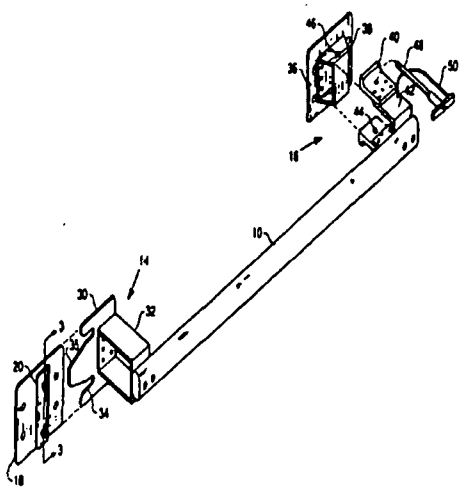

N92-29099* National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.

SUPERCONDUCTING BEARINGS WITH LEVITATION CONTROL CONFIGURATIONS Patent

YURY FLOM, inventor (to NASA) and JAMES D. ROYSTON, inventor (to NASA) 26 May 1992 13 p Filed 17 Apr. 1991 Supersedes N91-28578 (29 - 20, p 3354)

(NASA-CASE-GSC-13346-1; US-PATENT-5,117,139; US-PATENT-APPL-SN-691609; US-PATENT-CLASS-310-90.5; US-PATENT-CLASS-505-876; INT-PATENT-CLASS-H02K-1/14; INT-PATENT-CLASS-F16C-32/04) Avail: US Patent and Trademark Office

An improved superconducting bearing is presented. Rotor is confined within two superconducting circular bearing structures, each of which has a number of embedded heating elements, and will levitate rotor which has embedded magnets in its end. Heating elements are connected to a feedback control unit, as are rotor position sensors. The temperature profiles of each circular bearing structure is then adjusted according to the information on rotor position provided to control unit by position sensors. Novelty is believed to reside in providing a superconducting circular bearing structure allowing for a control of the levitating forces.

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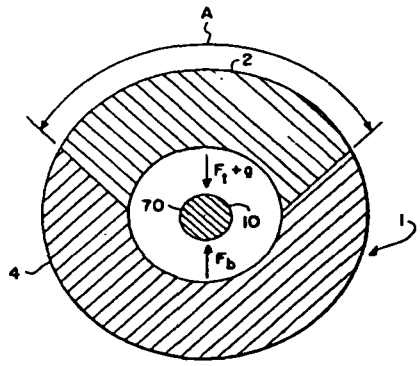

N92-29120* National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.

COUPLING DEVICE WITH IMPROVED THERMAL INTERFACE Patent

MALCOLM BRUCE MILAM, inventor (to NASA) 28 Apr. 1992 11 p Filed 13 Jun. 1991 Supersedes N91-28582 (29 - 20, p 3355) (NASA-CASE-GSC-13251-1; US-PATENT-5,108,214; US-PATENT-APPL-SN-714814; US-PATENT-CLASS-403-28; US-PATENT-CLASS-403-404; US-PATENT-CLASS-285-381; US-PATENT-CLASS-411-909; US-PATENT-CLASS-292-DIG.66; INT-PATENT-CLASS-F16C-9/00) Avail: US Patent and Trademark Office

The primary object of the present invention is to provide a simple, reliable, and lightweight coupling that will also have an efficient thermal interface. A further object of the invention is to provide a coupling that is capable of blind mating with little or no insertion forces. Another object of the invention is to provide a coupling that acts as a thermal regulator to maintain a constant temperature on one side of the coupling. Another object of the invention is to increase the available surface area of a coupling thus providing a larger area for the conduction of heat across the thermal interface. Another object of the invention is to provide a fluidic coupling that has no fluid passing across the interface, thus reducing the likelihood of leaks and contamination. The foregoing objects are achieved by utilizing, as in the prior art, a hot area (at an elevated temperature as compared to a cold area) with a need to remove excess heat from the hot area to a cold area. In this device, the thermal interface will occur not on a planar horizontal surface, but along a non-planar vertical surface, which will reduce the reaction forces and increase the thermal conductivity of the device. One non-planar surface is a surface on a cold pin extending from the cold area and the other non-planar surface is a surface on a hot pin extending from the hot area. The cold pin is fixed and does not move while the hot pin is a flexible member and its movement towards the cold pin will bring the two non-planar surfaces together forming the thermal interface. The actuating member for the device is a shape-memory actuation wire which is attached through an aperture to the hot pin and through another aperture to an actuation wire retainer. By properly programming the actuation wire, heat from the hot area will cause the actuation wire to bend the hot wire. Heat from the hot area will cause the actuation wire to bend the hot pin towards the cold pin forming the coupling and the desired thermal interface. The shape-memory actuation wire is made of a shape-memory-effect alloy such as Nitinol.

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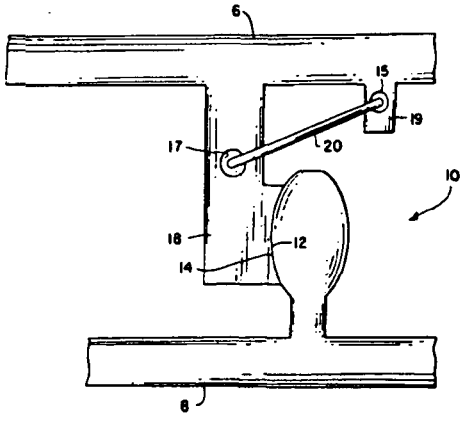

N92-29138* National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.

ROLLING FRICTION ROBOT FINGERS Patent

JOHN M. VRANISH, inventor (to NASA) 9 Jun. 1992 23 p Filed 17 Dec. 1990 Supersedes N91-17401(29 -9, p 1347) (NASA-CASE-GSC-13261-1; US-PATENT-5,120,101; US-PATENT-APPL-SN-628529; US-PATENT-CLASS-294-119.1; US-PATENT-CLASS-294-902; US-PATENT-CLASS-901-39; INT-PATENT-CLASS-B66C-1/62) Avail: US Patent and Trademark Office

A low friction, object guidance, and gripping finger device for a robotic end effector on a robotic arm is disclosed, having a pair of robotic fingers each having a finger shaft slideably located on a gripper housing attached to the end effector. Each of the robotic fingers has a roller housing attached to the finger shaft. The roller housing has a ball bearing mounted centering roller located at the center, and a pair of ball bearing mounted clamping rollers located on either side of the centering roller. The object has a recess to engage the centering roller and a number of seating ramps for engaging the clamping rollers. The centering roller acts to position and hold the object symmetrically about the centering roller with respect to the X axis and the clamping rollers act to position and hold the object with respect to the Y and Z axis.

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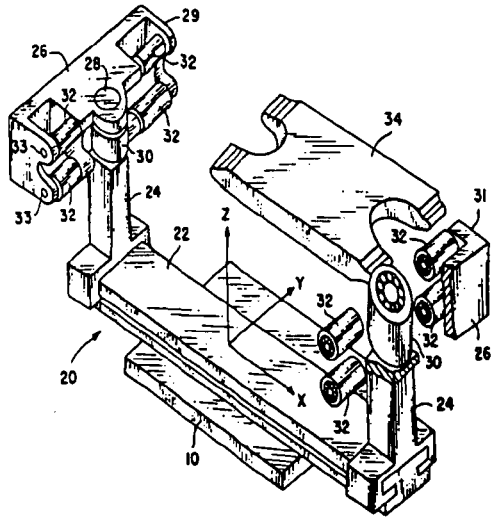

N92-29140* National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.

CONNECTION SPACE REDUCTION MECHANISM Patent

MALCOLM BRUCE MILAM, inventor (to NASA) 12 May 1992 10 p Filed 31 Dec. 1990 Supersedes N91-21525 (29 - 13, p 2093) (NASA-CASE-GSC-13220-1; US-PATENT-5,112,154; US-PATENT-APPL-SN-636532; US-PATENT-CLASS-403-13; US-PATENT-CLASS-403-24; INT-PATENT-CLASS-B25G-3/00) Avail: US Patent and Trademark Office

A connector assembly comprised of two halves, each respectively including a shell type connector subassembly, one being an active half and the other being a passive half is described. The active half includes an alignment cusp that causes a coupling motion in response to coming in contact with the outer portion of the other half, which causes the respective connectors within the two subassem-

blies to move toward each other into coupling relationship at twice the rate at which the two subassemblies come together. Both halves are adapted to rotate about and translate along respective mutually orthogonal axes to facilitate an interconnection.

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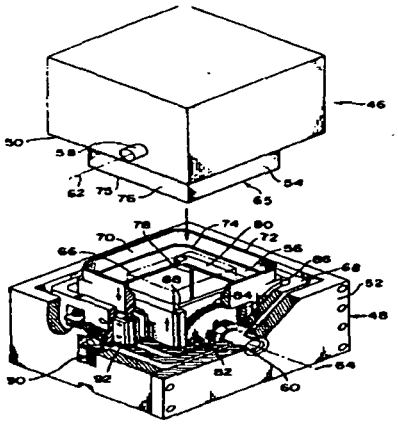


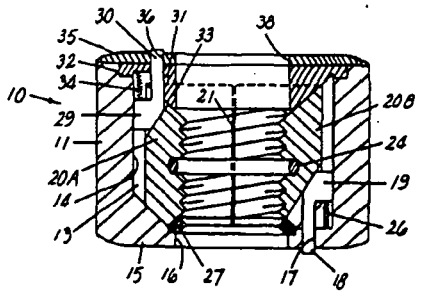
N92-29150* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.

QUICK APPLICATION/RELEASE NUT WITH ENGAGEMENT INDICATOR Patent

JAY M. WRIGHT, inventor (to NASA) 2 Jun. 1992 10 p Filed 13 Sep. 1991 Supersedes N92-11359 (30 - 2, p 244)
(NASA-CASE-MSC-21799-1; US-PATENT-5,118,237; US-PATENT-APPL-SN-759367; US-PATENT-CLASS-411-433; US-PATENT-CLASS-411-14; US-PATENT-CLASS-411-267; INT-PATENT-CLASS-F16B-37/08) Avail: US Patent and Trademark Office

A composite nut is shown which permits a fastener to be inserted or removed from either side with an indicator of fastener engagement. The nut has a plurality of segments, preferably at least three segments, which are internally threaded, spring loaded apart by an internal spring, and has detents on opposite sides which force the nut segments into operative engagements with a threaded member when pushed in and release the segments for quick insertion or removal of the nut when moved out. When the nut is installed, end pressure on one of the detents presses the nut segments into operative engagement with a threaded member where continued rotation locks the structure together with the detents depressed to indicate positive locking engagement of the nut. On removal, counterclockwise rotation of the nut relieves the endwise pressure on the detents, permitting internal springs to force the detents outward and allowing the nut segments to move outward and separate to permit quick removal of the fastener.

Official Gazette of the U.S. Patent and Trademark Office



N92-29151* National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.

CRYOGENIC SHUTTER Patent

RICHARD D. BARNEY, inventor (to NASA) and THOMAS J. MAGNER, inventor (to NASA) 7 Jul. 1992 9 p Filed 15 Nov. 1990 Division of US-Patent-Appl-SN-331119, filed 31 Mar. 1989 (NASA-CASE-GSC-13189-2; US-PATENT-5,128,796; US-PATENT-APPL-SN-613188; US-PATENT-APPL-SN-331119; US-PATENT-CLASS-359-236; US-PATENT-CLASS-359-230; INT-PATENT-CLASS-G02B-26/02) Avail: US Patent and Trademark Office

A magnetically operated shutter mechanism is provided that will function in cryogenic or cryogenic zero gravity environments to selectively block radiation such as light from passing through a window to a target object such as a mirror or detector located inside a cryogenic container such as a dewar. The mechanism includes a shutter paddle blade that is moved by an electromagnetically actuated torquing device between an open position where the target object is exposed to ambient radiation or light and a closed position where the shutter paddle blade shields the ambient radiation or light from the target object. The purpose of the shuttering device is to prevent the mirror or other target object from being directly exposed to radiation passing through the window located on the side wall of the dewar, thereby decreasing or eliminating any temperature gradient that would occur within the target object due to exposure to the radiation. A special nylon bearing system is utilized to prevent the device from binding during operation and the paddle blade is also thermally connected to a reservoir containing cryogen to further reduce the internal temperature.

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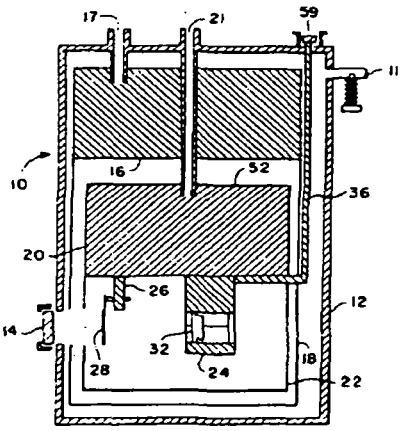


N92-29762*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.

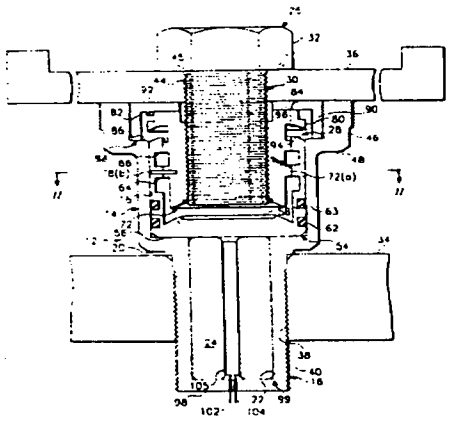
FASTENING APPARATUS HAVING SHAPE MEMORY ALLOY ACTUATOR Patent Application

DARIN MCKINNIS, inventor (to NASA) 13 May 1992 24 p (NASA-CASE-MSC-21935-1; NAS 1.71:MSC-21935-1; US-PATENT-APPL-SN-882408) Avail: CASI HC A03/MF A01

A releasable fastening apparatus is presented. The device includes a connecting member and a housing. The housing supports a gripping mechanism that is adapted to engage the connecting member. A triggering member is movable within the housing between a first position in which it constrains the gripping mechanism in locked engagement with the connecting member, and a second position in which the gripping mechanism is disengaged from the connecting

member. A shaped memory alloy actuator is employed for translating the triggering member from its first to its second position. The actuator is designed to expand longitudinally when transitioned from a martensitic to an austenitic state.

NASA



N92-29765*# National Aeronautics and Space Administration. Pasadena Office, CA.

POSITION-ERROR-BASED FORCE REFLECTION AND COMPLIANCE CONTROL Patent Application

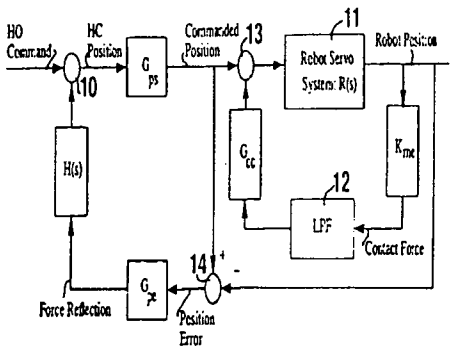
WON S. KIM, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 8 Jul. 1992 33 p

(Contract NAS7-918)

(NASA-CASE-NPO-18668-1-CU; NAS 1.71:NPO-18668-1-CU; US-PATENT-APPL-SN-912955) Avail: CASI HC A03/MF A01

Two types of systems for force-reflecting control, which enables high force-reflection gain, are presented: (1) position-error-based force reflection and low-pass-filtered force reflection. Both of the systems are combined with shared compliance control. In the position-error-based class, the position error between the commanded and the actual position of a compliantly controlled robot is used to provide force reflection. In the low-pass-filtered force reflection class, the low-pass-filtered output of the compliance control is used to provide force reflection. The increase in force reflection gain can be more than 10-fold as compared to a conventional high-bandwidth pure force reflection system, when high compliance values are used for the compliance control.

NASA



N92-30026*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.

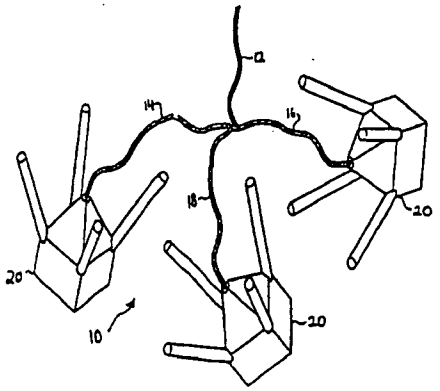
FINGERED BOLA BODY, BOLA WITH SAME, AND METHODS OF USE Patent Application

JOHN M. DZENITIS, inventor (to NASA) and LINDA W. BILLICA, inventor (to NASA) 5 Jun. 1992 16 p

(NASA-CASE-MSC-21967-1; NAS 1.71:MSC-21967-1; US-PATENT-APPL-SN-892053) Avail: CASI HC A03/MF A01

The present invention discloses bola bodies, bolas, and a snaring method which use such devices. A bola body, according to the present invention, is nonspherical or irregular in shape rather than a smooth sphere or ovoid body. One or more fingers extends from the bola body. These fingers may be relatively straight or they may have crooked or bent portions to enhance entanglement with a bola line or lines or with each other. Two or more of such fingers may be used and may be regularly or irregularly spaced apart on a bola body. A bola with such bodies includes lines which are connected to the other bodies. In one particular embodiment of a bola body, according to the present invention, the body has an irregular shape with a bottom rectangular portion and a top pyramid portion forming a nose. A plurality of fingers extended from the pyramidal top portion with one finger extended up and away from each of four corners of the top portion. Such a bola body tends to be initially oriented with its nose and fingers against an object being snared since the body is pulled nose first when a bola line is secured at the tip of the pyramidal portion of the bola body. With such a bola, an unwrapping bola body can slip around a target member so that two of the rod-shaped fingers catch a bola line and guide it into an area or crook between the fingers and a side of the top pyramidal portion of the bola body. Tension on the bola line maintains the line in the crook and tends to press the fingers against the unwrapped target member to stabilize the wrapping of the line about the target member. With such a bola, it is difficult for two or more lines unwrapping in different directions to move past one another without being forced together by line tension. Also, the fingers of such bola bodies may hook and hold each other. The fingers may also hook or entangle some object on or portion of the target member. A probable known target member has known dimensions and shapes so that the bola may be sized and configured to reliably snare such a known target. The bolas can be optimally sized, fashioned, and configured to contact and hold a probable target of known size, dimension, and shape.

Author



N92-30082*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.

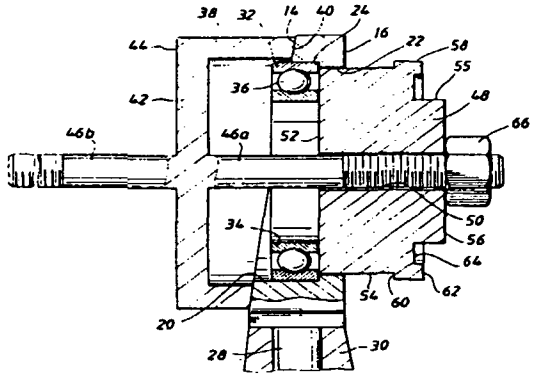
BEARING SERVICING TOOL Patent Application

REX A. BOYCE, inventor (to NASA) 31 Oct. 1991 18 p

(NASA-CASE-MSC-21881-1; NAS 1.71:MSC-21881-1; US-PATENT-APPL-SN-785637) Avail: CASI HC A03/MF A01

A tool for removing and/or replacing bearings in situ is presented which comprises a brace having a first end adapted to engage a first end of the bearing housing, and a second end adapted to engage a second end of the bearing housing. If the two ends of the bearing housing are different in configuration, the respective ends of the brace are correspondingly configured. An elongate guide member integral with the brace has two parts, each projecting endwise from a respective end of the brace. A pressure plate is alternatively removably mountable on either part of the guide member for longitudinal movement therealong, and has first and second ends of different configurations adapted to engage first and second ends respectively of the bearing. A threaded-type drive is cooperative between the guide and the pressure plate to move the pressure plate longitudinally along the guide and apply a force to the bearing, either to remove the bearing from its housing, or to emplace a new bearing in the housing.

NASA



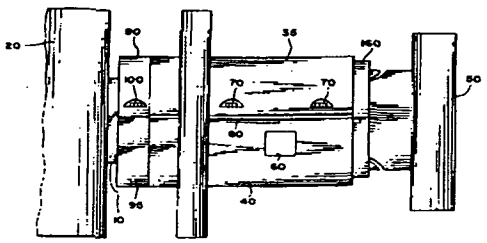
N92-30097*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

SHAFT MOUNT FOR DATA COUPLER SYSTEM Patent Application

JAMES R. ELLIOTT, JR., inventor (to NASA) and MARK T. LORD, inventor (to NASA) 3 Oct. 1991 9 p (NASA-CASE-LAR-13805-1; NAS 1.71:LAR-13805-1; US-PATENT-APPL-SN-770509) Avail: CASI HC A02/MF A01

A device for mounting a data transmission apparatus to a rotating, tapered, and instrumented shaft is provided. This device permits attachment without interfering with shaft rotation or the accuracy of data output, and prevents both radial and axial slippage of the data transmission apparatus. The mounting device consists of a sleeve assembly which is attached to the shaft by means of clamps that are situated at some distance removed from the instrumented area of the shaft. The data transmission device is secured to the sleeve such that the entire assembly rotates with the shaft. Shim adjustments between sleeve sections assure that a minimum compressive load is transferred to the instrumented area of the shaft and a rubber lining is affixed to a large portion of the interior surface of the sleeve to absorb vibration.

NASA



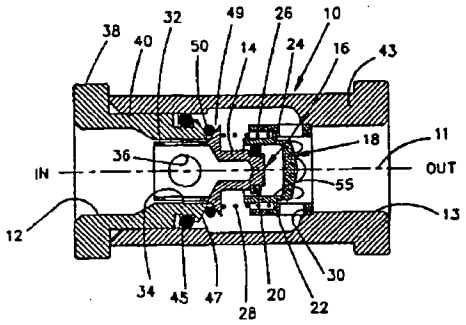
N92-30101*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.

CHECK VALVE WITH POPPET DAMPING MECHANISM Patent Application

BRIAN G. MORRIS, inventor (to NASA) 22 Jun. 1992 14 p (NASA-CASE-MSC-21903-1; NAS 1.71:MSC-21903-1; US-PATENT-APPL-SN-902266) Avail: CASI HC A03/MF A01

An inline check valve for a flow line is presented where the valve element is guided for inline travel forward and rearward of a valve sealing member and is spring biased to a closed sealing condition. One of the guides for the valve element includes a dashpot bore and plunger member to control the rate of travel of the valve element in either direction as well as provided a guiding function. The dashpot is not anchored to the valve body so that the valve can be functional even if the plunger member becomes jammed in the dashpot.

NASA



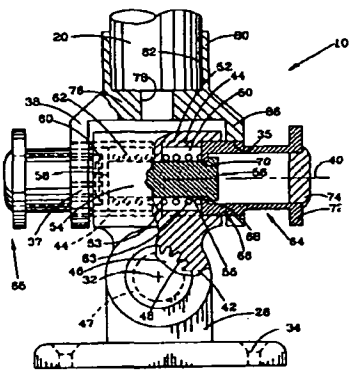
N92-30316*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.

QUICK ACTING GIMBAL JOINT Patent Application

WILLIAM B. WOOD, inventor (to NASA) and GARY D. KRCH, inventor (to NASA) (ILC Dover, Frederica, DE.) 16 Jun. 1992 20 p (NASA-CASE-MSC-21918-1; NAS 1.71:MSC-21918-1; US-PATENT-APPL-SN-899536) Avail: CASI HC A03/MF A01

The present invention relates to an adjustable linkage assembly for selectively retaining the position of one member pivotable with respect to another member. More specifically, the invention relates to a linkage assembly commonly referred to as a gimbal joint, and particularly to a quick release or quick acting gimbal joint. The assembly is relatively simple in construction, compact in size, and has superior locking strength in any selected position. The device can be quickly and easily actuated, without separate tooling, by inexperienced personnel or by computer controlled equipment. It also is designed to prevent inadvertent actuation.

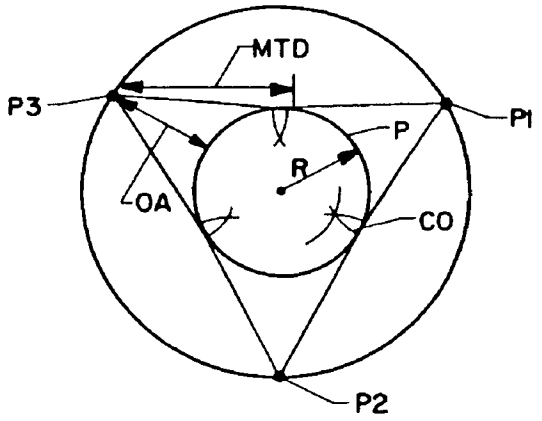
NASA



N92-30388*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
METHOD FOR REMOTELY POWERING A DEVICE SUCH AS A LUNAR ROVER Patent Application
RUSSELL J. DEYOUNG, inventor (to NASA), MICHAEL D. WILLIAMS, inventor (to NASA), GILBERT H. WALKER, inventor (to NASA), GREGORY L. SCHUSTER, inventor (to NASA), and JA H LEE, inventor (to NASA) 7 Jan. 1992 25 p
(NASA-CASE-LAR-14789-1; NAS 1.71:LAR-14789-1; US-PATENT-APPL-SN-822457) Avail: CASI HC A03/MF A01

A method of supplying power to a device such as a lunar rover located on a planetary surface is provided. At least one, and preferably three, laser satellites are set in orbit around the planet. Each satellite contains a nuclear reactor for generating electrical power. This electrical power is converted into a laser beam which is passed through an amplifying array and directed toward the device such as a lunar rover. The received laser beam is then converted into electrical power for use by the device.

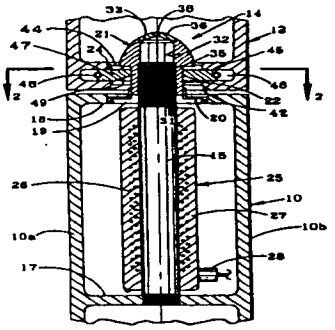
NASA



N92-30540*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
METHOD AND APPARATUS FOR PRELOADING A JOINT BY REMOTELY OPERABLE MEANS Patent Application
ROBERT O. SHELTON, inventor (to NASA) 1 Jun. 1992 21 p
(NASA-CASE-MSC-21940-1; NAS 1.71:MSC-21940-1; US-PATENT-APPL-SN-892072) Avail: CASI HC A03/MF A01

The invention is a method and apparatus for joining structures, an active structure and a passive structure, and imposing a tensile pre-load on the joint by a remotely operable mechanism comprising a heat contractible joining element. The method and apparatus include mounting on the structure, a probe shaft of material which is transformable from an expanded length to a contracted length when heated to a specific temperature range. The shaft is provided with a probe head which is receivable in a receptacle opening formed in the passive structure, when the active structure is moved into engagement therewith by an appropriate manipulator mechanism. A latching system mounted on the structure adjacent to the receptacle opening captures the probe head, when the probe head is inserted a predetermined amount. A heating coil on the shaft is energizable by remote control for heating the shaft to a temperature range which transforms the shaft to its contracted length, whereby a latching shoulder thereof engages latching elements of the latching system and imposes a tensile preload on the structural joint. Provision is also made for manually adjusting the probe head on the shaft to allow for manual detachment of the structures or manual preloading of the structural joint.

NASA



N92-33018* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
ELECTROMAGNETIC ATTACHMENT MECHANISM Patent
LEO G. MONFORD, JR., inventor (to NASA) 8 Sep. 1992 22 p Filed 31 Dec. 1990 Supersedes N91-23490 (29 - 15, p 2435)
(NASA-CASE-MSC-21463-1; US-PATENT-5,145,227; US-PATENT-APPL-SN-636531; US-PATENT-CLASS-294-65.5; US-PATENT-CLASS-244-161; US-PATENT-CLASS-294-66.2; US-PATENT-CLASS-294-86.4; US-PATENT-CLASS-294-907; US-PATENT-CLASS-414-737; US-PATENT-CLASS-901-40) Avail: US Patent and Trademark Office

An electromagnetic attachment mechanism is disclosed for use as an end effector of a remote manipulator system. A pair of electromagnets, each with a U-shaped magnetic core with a pull-in coil and two holding coils, are mounted by a spring suspension system on a base plate of the mechanism housing with end pole pieces adapted to move through openings in the base plate when the attractive force of the electromagnets is exerted on a strike plate of a grapple fixture affixed to a target object. The pole pieces are spaced by an air gap from the strike plate when the mechanism first contacts the grapple fixture. An individual control circuit and power source is provided for the pull-in coil and one holding coil of each electromagnet. A back-up control circuit connected to the two power sources and a third power source is provided for the remaining holding coils. When energized, the pull-in coils overcome the suspension system and air gap and are automatically de-energized when the pole pieces move to grapple and impose a preload force across the grapple interface. A battery backup is a redundant power source for each electromagnet in each individual control circuit and is automatically connected upon failure of the primary source. A centerline mounted camera and video monitor are used in cooperation with a target pattern on the reflective surface of the strike plate to effect targeting and alignment.

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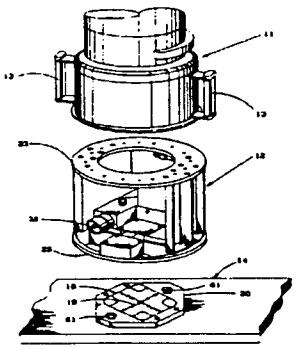

N92-33031* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
NONCIRCULAR ROLLING JOINTS FOR VIBRATIONAL REDUCTION IN SLEWING MANEUVERS Patent
MENG-SANG CHEW, inventor (to NASA), JER-NAN JUANG, inventor (to NASA), and LI-FARN YANG, inventor (to NASA) 15 Sep. 1992 13 p Filed 28 Mar. 1991 Supersedes N91-28580 (29 - 20, p 3354) (NASA-CASE-LAR-14515-1-CU; US-PATENT-5,146,803; US-PATENT-APPL-SN-678551; US-PATENT-CLASS-74-437; US-PATENT-CLASS-74-25; INT-PATENT-CLASS-F16H-49/00; INT-PATENT-CLASS-F16H-21/16) Avail: US Patent and Trademark Office

A rolling joint is provided for obtaining slewing maneuvers for various apparatus including space structures, space vehicles, robotic manipulators, and simulators. Two noncircular cylinders, namely a drive and a driven cylinder, are provided in driving contact with one another. This contact is maintained by two pairs of generally S-shaped bands, each pair forming a generally 8-shaped coupling tightly about the circumferential periphery of the noncircular drive and driven cylinders. A stationarily fixed arm extends between and is rotatably journalled with a drive axle and a spindle axle respectively extending through selected rotational points of the drive cylinder and of the driven cylinder. The noncircular cylinders are profiled to obtain the desired varying gear ratio. The novelty of the present invention resides in using specifically profiled noncircular cylinders to obtain a desired varying gear ratio.

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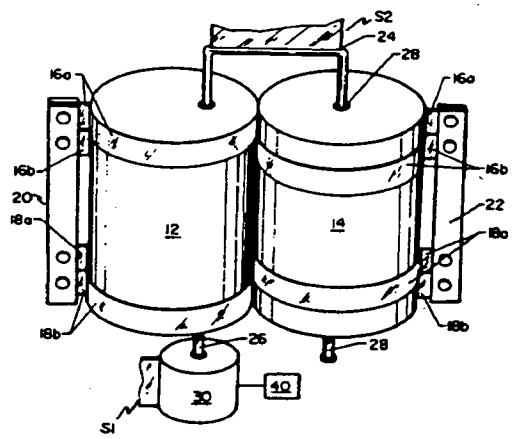

N92-33616* National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
PAGE TURNING SYSTEM Patent
JAMES J. KERLEY, inventor (to NASA) and WAYNE D. EKLUND, inventor (to NASA) 22 Sep. 1992 9 p Filed 24 Dec. 1991 Supersedes N92-24059 (30 - 14, p 2386)
(NASA-CASE-GSC-13415-1; US-PATENT-5,149,046; US-PATENT-APPL-SN-812932; US-PATENT-CLASS-248-453; US-PATENT-CLASS-248-455; US-PATENT-CLASS-248-463; INT-PATENT-CLASS-A47B-97/04) Avail: US Patent and Trademark Office

A device for holding reading materials for use by readers without arm mobility is presented. The device is adapted to hold the reading materials in position for reading with the pages displayed to enable turning by use of a rubber tipped stick that is held in the mouth and has a pair of rectangular frames. The frames are for holding and positioning the reading materials opened in reading posture with the pages displayed at a substantially unobstructed sighting position for reading. The pair of rectangular frames are connected to one another by a hinge so the angle between the frames may be varied thereby varying the inclination of the reading material. A pair of bent spring mounted wires for holding opposing pages of the reading material open for reading without substantial visual interference of the pages is mounted to the base. The wires are also adjustable to the thickness of the reading material and have a variable friction adjustment. This enables the force of the wires against the pages to be varied and permits the reader to manipulate the pages with the stick.

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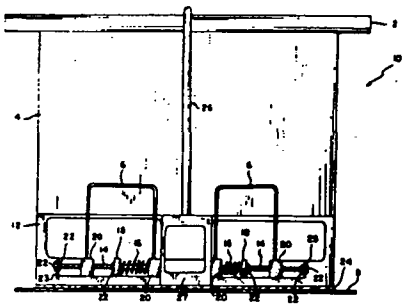

N92-33634* National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
FLEXIBLE ROBOTIC ARM Patent
ISRAEL A. MOYA, inventor (to NASA) and PHILIP A. STUDER, inventor (to NASA) 1 Sep. 1992 7 p Filed 4 Sep. 1991 Supersedes N92-24060 (30 - 14, p 2386)
(NASA-CASE-GSC-13161-1; US-PATENT-5,142,932; US-PATENT-APPL-SN-754828; US-PATENT-CLASS-74-479; US-PATENT-CLASS-310-82; US-PATENT-CLASS-310-112; US-PATENT-CLASS-901-9; US-PATENT-CLASS-901-23; US-PATENT-CLASS-901-28; INT-PATENT-CLASS-B25J-17/00) Avail: US Patent and Trademark Office

A plurality of identical modules are serially connected together with each module including a base plate and a top plate interconnected by a ball joint assembly so that the top plate is adapted to pivotally nutate around the base plate to describe a cone in space. An array of twenty-four electromagnets, sequentially energized in sets of three, are arranged in a ring around the periphery of the base plate. Selective energization of the eight sets of electromagnets causes the rim of the top plate to be magnetically attracted to the energized electromagnets. The tilt of the top pivot plate is detected and controlled over a range of 360 degrees, thus permitting a series string of modules to assume any desired elongated configuration.

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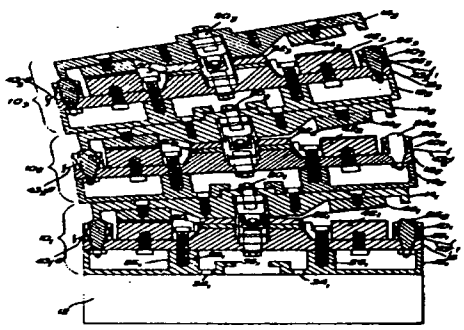

N92-34173* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

LINEAR MASS ACTUATOR Patent

SIDNEY E. HOLLOWAY, III, inventor (to NASA), EDWARD A. CROSSLEY, JR., inventor (to NASA), IRBY W. JONES, inventor (to NASA), JAMES B. MILLER, inventor (to NASA), C. CALVIN DAVIS, inventor (to NASA), VAUGHN D. BEHUN, inventor (to NASA), and LEWIS R. GOODRICH, SR., inventor (to NASA) 29 Sep. 1992 12p Filed 22 Jul. 1991 Supersedes N91-32511 (29 - 24, p 4028) (NASA-CASE-LAR-14352-1; US-PATENT-5,150,875; US-PATENT-APPL-SN-735149; US-PATENT-CLASS-248-550; US-PATENT-CLASS-188-378; INT-PATENT-CLASS-F16M-13/00) Avail: US Patent and Trademark Office

A linear mass actuator includes an upper housing and a lower housing connectable to each other and having a central passageway passing axially through a mass that is linearly movable in the central passageway. Rollers mounted in the upper and lower housings in frictional engagement with the mass translate the mass linearly in the central passageway and drive motors operatively coupled to the roller means, for rotating the rollers and driving the mass axially in the central passageway.

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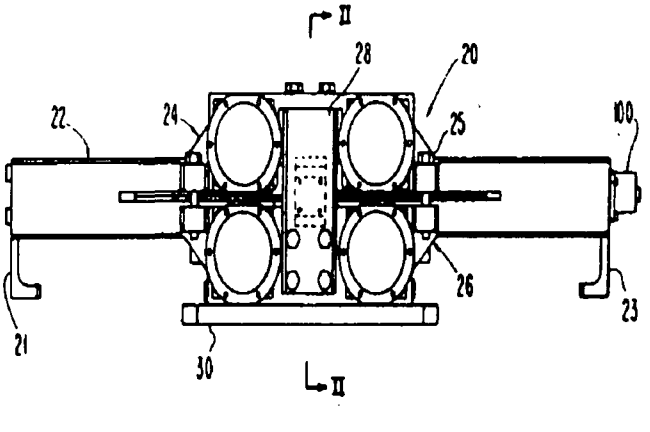


N92-34205*# National Aeronautics and Space Administration. Pasadena Office, CA.

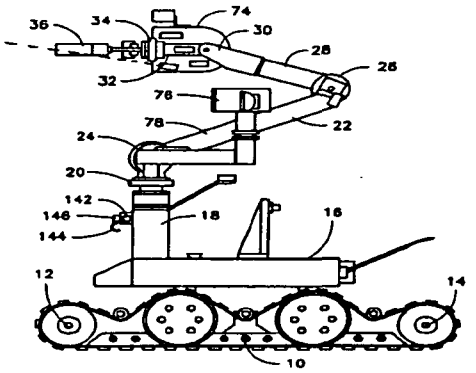
HAZARDOUS MATERIALS EMERGENCY RESPONSE MOBILE ROBOT Patent Application

HENRY W. STONE, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.), JAMES LLOYD, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.), and GEORGE ALAHUZOS, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 20 Jul. 1992 25 p (Contract NAS7-918)

(NASA-CASE-NPO-18690-1-CU; NAS 1.71:NPO-18690-1-CU; US-PATENT-APPL-SN-917554) Avail: CASI HC A03/MF A01

A simple or unsophisticated robot incapable of effecting straight-line motion at the end of its arm inserts a key held in its end effector or hand into a door lock with nearly straight-line motion by gently thrusting its back heels downwardly so that it pivots forwardly on its front toes while holding its arm stationary. The relatively slight arc traveled by the robot's hand is compensated by a complaint tool with which the robot hand grips the door key. A visible beam is projected through the axis of the hand or gripper on the robot arm end at an angle to the general direction in which the robot thrusts the gripper forward. As the robot hand approaches a target surface, a video camera on the robot wrist watches the beam spot on the target surface fall from a height proportional to the distance between the robot hand and the target surface until the beam spot is nearly aligned with the top of the robot hand. Holes in the front face of the hand are connected through internal passages inside the arm to an on-board chemical sensor. Full rotation of the hand or gripper about the robot arm's wrist is made possible by slip rings in the wrist which permit passage of the gases taken in through the nose holes in the front of the hand through the wrist regardless of the rotational orientation of the wrist.

NASA



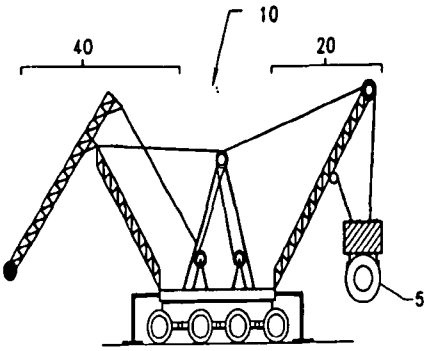
N92-34212*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

COUNTER-BALANCED, MULTIPLE CABLE CONSTRUCTION CRANE Patent Application

MARTIN M. MIKULAS, JR., inventor (to NASA) and LI-FARN YANG, inventor (to NASA) (Colorado Univ., Boulder.) 18 Nov. 1991 21 p (NASA-CASE-LAR-14565-1-CU; NAS 1.71:LAR-14565-1-CU; US-PATENT-APPL-SN-793974) Avail: CASI HC A03/MF A01

The invention is a counter-balanced, multiple cable construction crane. The apparatus for hoisting payloads comprises a crane having a lifting means, the lifting means comprising an end effector means and three suspension means or cables. One end of each cable attaches to a different winding means located on the lifting means, and the other end of each cable attaches to a different point on the end effector, such that the three cables have a theoretical point of convergence with this point corresponding to the center of mass of the payload. Three controls command rotation of the winding means to a predetermined position. Accordingly, the crane provides precise and autonomous positioning of the payload without human guidance. The crane further comprises a counter-balancing means. Two controls position the counter-balancing means to offset the overturning moment which arises during the lifting of heavy payloads.

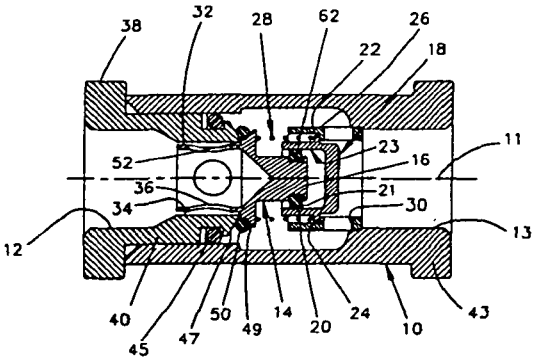
NASA



N92-34242*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
CHECK VALVE WITH POPPET DASHPOT/FRICTIONAL DAMPING MECHANISM Patent Application
BRIAN G. MORRIS, inventor (to NASA) 22 Jun. 1992 15 p (NASA-CASE-MSC-21950-1; NAS 1.71:MSC-21950-1; US-PATENT-APPL-SN-902265) Avail: CASI HC A03/MF A01

An inline check valve for a flow line where the valve element is guided for inline travel forward and rearward of a valve sealing member and is spring biased to a closed sealing condition is presented. One of the guides for the valve element includes a dashpot housing with a bore and plunger member to control the rate of travel of the valve element in either direction, providing a guiding function. The plunger member is arranged with a dashpot ring to frictionally contact the dashpot bore and has an interior tortuous flow path from one side to the other side of the dashpot ring. The dashpot housing is not anchored to the valve body so that the valve can be functional even if the dashpot ring becomes jammed in the dashpot housing.

NASA



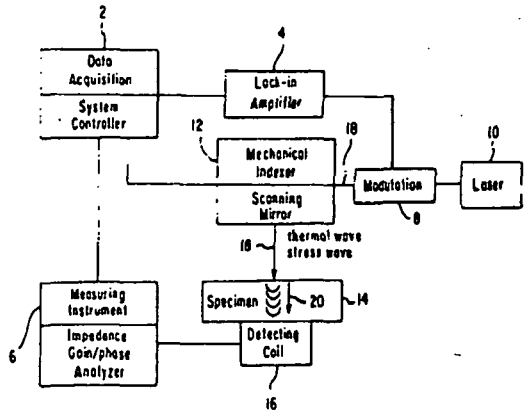
38
QUALITY ASSURANCE AND RELIABILITY

Includes product sampling procedures and techniques; and quality control.

N92-29154* National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
METHOD FOR ADVANCED MATERIAL CHARACTERIZATION BY LASER INDUCED EDDY CURRENT IMAGING Patent
ENGMIN J. CHERN, inventor (to NASA) 23 Jun. 1992 6 p Filed 5 Sep. 1991 Supersedes N92-23376 (29 - 14, p 2386) (NASA-CASE-GSC-13386-1; US-PATENT-5,124,640; US-PATENT-APPL-SN-758977; US-PATENT-CLASS-324-224; US-PATENT-CLASS-324-226; US-PATENT-CLASS-324-262; US-PATENT-CLASS-356-432; US-PATENT-CLASS-374-4; US-PATENT-CLASS-374-45; INT-PATENT-CLASS-G01R-35/00) Avail: US Patent and Trademark Office

An improved nondestructive evaluation (NDE) method uses a laser source with modulator and scanning mirror, a pancake shape eddy current detecting coil, a lock-in amplifier, a system controller, and an impedance gain/phase analyzer. The laser is directed by the scanning mirror to a specimen to be analyzed. A very localized or small area of the specimen is impacted directly by the laser beam, creating a thermal or stress wave in the specimen. An impedance gain/phase analyzer is connected to the eddy current detecting coil and to a lock-in amplifier through the system controller. The lock-in amplifier is also synchronized to the laser modulator. The system controller is used to control the lock-in amplifier, scanning mirror, and to process data from the analyzer. Raster scanning of the laser beam across the specimen allows the detection by the coil of the laser generated thermal and elastic strains induced in the specimen by the laser. The rastering of the laser beam is controlled by the controller by positioning the mirror.

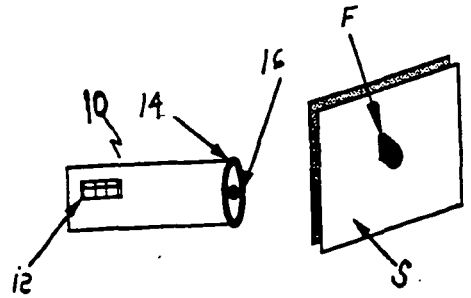
Official Gazette of the U.S. Patent and Trademark Office



N92-29829*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
METHOD AND APPARATUS FOR THERMOGRAPHICALLY AND QUANTITATIVELY ANALYZING A STRUCTURE FOR DISBONDS AND/OR INCLUSIONS Patent Application
JOSEPH S. HEYMAN, inventor (to NASA) and WILLIAM P. WINFREE, inventor (to NASA) 5 May 1992 19 p (NASA-CASE-LAR-14559-1; NAS 1.71:LAR-14559-1; US-PATENT-APPL-SN-878631) Avail: CASI HC A03/MF A01

The nondestructive detection of disbonds or inclusions in laminates is paramount to ensure mission safety in aerospace vehicles. The present invention employs a heat source such as a magnetic/induction eddy current generator to remotely heat a region of a surface of a test structure to a desired depth. The frequency of the heat source is varied to heat to the desired depth. A thermal sensor senses temperature changes in the heated region as a function of time. A computer compares these sensed temperature changes with calibration standards of a similar sample having known disbond or inclusion geography(ies) to analyze the test structure. A plurality of sensors can be arranged linearly to sense vector heat flow.

NASA



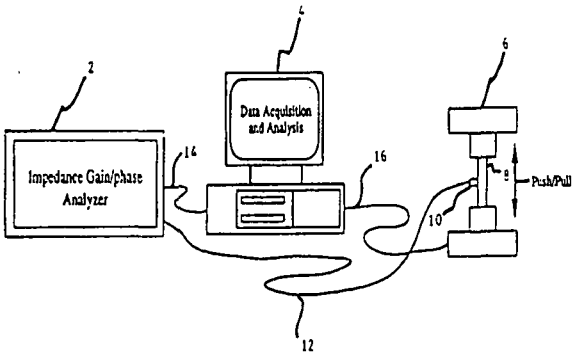
39
STRUCTURAL MECHANICS

Includes structural element design and weight analysis; fatigue; and thermal stress.

N92-23549*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
METHOD AND APPARATUS FOR DETERMINATION OF MATERIAL RESIDUAL STRESS Patent Application
ENGMIN J. CHERN, inventor (to NASA) and YURY FLOM, inventor (to NASA) 2 Dec. 1991 13 p
(NASA-CASE-GSC-13451-1; NAS 1.71:GSC-13451-1; US-PATENT-APPL-SN-801141) Avail: CASI HC A03/MF A01

A device for the determination of residual stress in a material sample consisting of a sensor coil, adjacent to the material sample, whose resistance varies according to the amount of stress within the material sample, a mechanical push-pull machine for imparting a gradually increasing compressional and tensional force on the material sample, and an impedance gain/phase analyzer and personal computer (PC) for sending an input signal to and receiving an input signal from the sensor coil. The PC will measure and record the change in resistance of the sensor coil and the corresponding amount of strain of the sample. The PC will then determine from the measurements of change of resistance and corresponding strain of the sample the point at which the resistance of the sensor coil is at a minimum and the corresponding value and type of strain of the sample at that minimum resistance point thereby enabling a calcula tion of the residual stress in the sample.

NASA



N92-28757* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
METHOD AND APPARATUS FOR USING MAGNETO-ACOUSTIC REMANENCE TO DETERMINE EMBRITTLEMENT Patent
SIDNEY G. ALLISON, inventor (to NASA), MIN NAMKUNG, inventor (to NASA), WILLIAM T. YOST, inventor (to NASA), and JOHN H. CANTRELL, inventor (to NASA) 9 Jun. 1992 10 p Filed 15 Apr. 1991 Continuation-in-part of abandoned US-Patent-Appl-SN-449211, filed 12 Dec. 1989 which is a division of US-Patent-Appl-SN-210486, filed 23 Jun. 1988
(NASA-CASE-LAR-13817-5; US-PATENT-5,121,058; US-PATENT-APPL-SN-686263; US-PATENT-APPL-SN-449211; US-PATENT-APPL-SN-210486; US-PATENT-CLASS-324-235; US-PATENT-CLASS-73-601; US-PATENT-CLASS-324-226; INT-PATENT-CLASS-G01R-33/12; INT-PATENT-CLASS-G01N-27/80) Avail: US Patent and Trademark Office

A method and apparatus for testing steel components for temperature embrittlement uses magneto-acoustic emission to nondestructively evaluate the component are presented. Acoustic emission signals occur more frequently at higher levels in embrittled components. A pair of electromagnets are used to create magnetic induction in the test component. Magneto-acoustic emission signals may be generated by applying an AC current to the electromagnets. The acoustic emission signals are analyzed to provide a comparison between a component known to be unembrittled and a test component. Magnetic remanence is determined by applying a DC current to the electromagnets and then by turning the magnets off and observing the residual magnetic induction.

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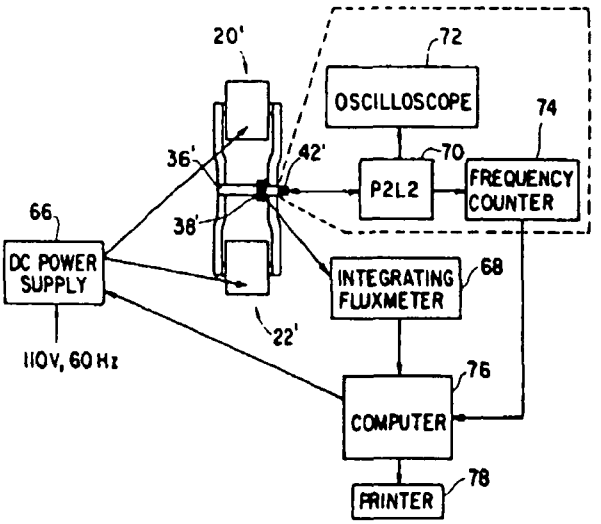

N92-29101* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
MAGNETIC REMANENCE METHOD AND APPARATUS TO TEST MATERIALS FOR EMBRITTLEMENT Patent
SIDNEY G. ALLISON, inventor (to NASA), MIN NAMKUNG, inventor (to NASA), WILLIAM T. YOST, inventor (to NASA), and JOHN H. CANTRELL, inventor (to NASA) 26 May 1992 10 p Filed 2 Nov. 1990 Division of abandoned US-Patent-Appl-SN-449211, filed 12 Dec. 1989 which is a division of US-Patent-Appl-SN-210486, filed 23 Jun. 1988
(NASA-CASE-LAR-13817-4; US-PATENT-5,117,184; US-PATENT-APPL-SN-608504; US-PATENT-APPL-SN-449211; US-PATENT-APPL-SN-210486; US-PATENT-CLASS-324-239; INT-PATENT-CLASS-G01R-33/12; INT-PATENT-CLASS-G01R-27/72) Avail: US Patent and Trademark Office

A method and apparatus for testing steel components for temper embrittlement uses magneto-acoustic emission to nondestructively evaluate the component. Acoustic emission signals occur more frequently at higher levels in embrittled components. A pair of electromagnets are used to create magnetic induction in the test component. Magneto-acoustic emission signals may be generated by applying an AC current to the electro-magnets. The acoustic emission signals are analyzed to provide a comparison between a

component known to be unembrittled and a test component. Magnetic remanence is determined by applying a DC current to the electromagnets, then turning the magnets off and observing the residual induction.

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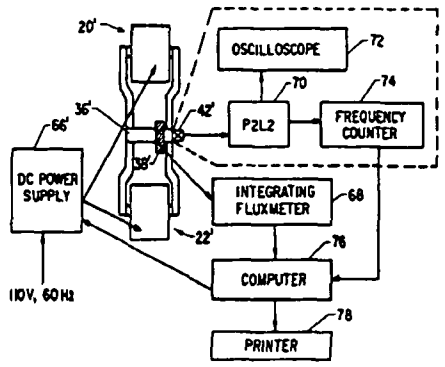

N92-29155* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

MAGNETO ACOUSTIC EMISSION METHOD FOR TESTING MATERIALS FOR EMBRITTLEMENT Patent

SIDNEY G. ALLISON, inventor (to NASA), MIN NAMKUNG, inventor (to NASA), WILLIAM T. YOST, inventor (to NASA), and JOHN H. CANTRELL, inventor (to NASA) 28 Apr. 1992 10 p Filed 12 Dec. 1989 Division of US-Patent-Appl-SN-210486, filed 23 Jun. 1988

(NASA-CASE-LAR-13817-2; US-PATENT-5,109,195; US-PATENT-APPL-SN-449209; US-PATENT-APPL-SN-210486; US-PATENT-CLASS-324-235; US-PATENT-CLASS-73-801; US-PATENT-CLASS-324-209; US-PATENT-CLASS-324-226; US-PATENT-CLASS-324-227; US-PATENT-CLASS-324-239) Avail: US Patent and Trademark Office

A method and apparatus for testing steel components for temper embrittlement uses magneto-acoustic emission to nondestructively evaluate the component. Acoustic emission signals occur more frequently at higher levels in embrittled components. A pair of electromagnets are used to create magnetic induction in the test component. Magneto-acoustic emission signals may be generated by applying an ac current to the electromagnets. The acoustic emission signals are analyzed to provide a comparison between a component known to be unembrittled and a test component. Magnetic remanence is determined by applying a dc current to the electromagnets, then turning the magnets off and observing the residual magnetic induction.

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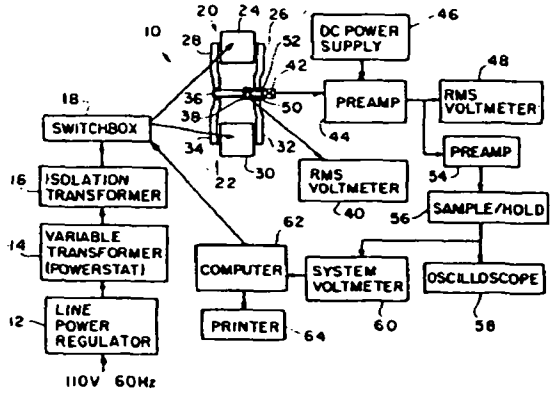


N92-30028*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

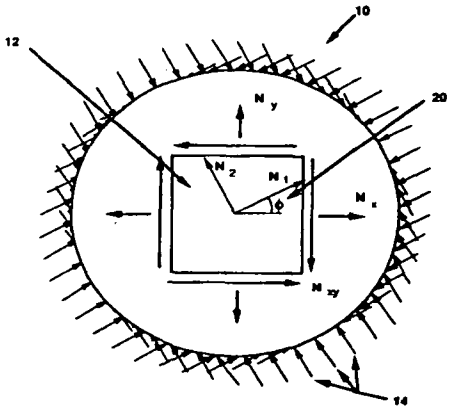
COMBINED LOAD TEST APPARATUS FOR FLAT PANELS Patent Application

ROBERT R. MCWITHEY, inventor (to NASA) (AS&M, Inc., Hampton, VA.), CARL J. MARTIN, JR., inventor (to NASA) (Lockheed Engineering and Sciences Co., Hampton, VA.), and JEFFREY A. CERRO, inventor (to NASA) (Lockheed Engineering and Sciences Co., Hampton, VA.) 7 Apr. 1992 16 p

(NASA-CASE-LAR-14698-1; NAS 1.71:LAR-14698-1; US-PATENT-APPL-SN-866769) Avail: CASI HC A03/MF A01

Future hypersonic aircraft such as the National Aero-Space Plane and a high speed civil transport will require the design and use of efficient, highly-loaded, flat structural panels to achieve mission requirements. These panels will be subjected to severe combinations of in-plane mechanical distributed loads (i.e., normal loads in two perpendicular directions plus a shear load), in addition to pressure and thermal loads. A testing apparatus is provided for applying uniform combined in-plane stresses to a flat panel containing an interior test area. Actuators cause two sets of load rods to apply loads to the edge of the flat panel. The first set applies loads which are perpendicular to and independent of the loads applied by the second set. The loads are applied according to a cosine load distribution to obtain a uniform stress field within the test area. The flat panel may be rotated with respect to the applied loads to obtain a wide range of combined stresses in the test area. Movement outside the plane of the flat panel may be selectively prevented by connecting the flat panel to a restraining disk by support rods. The support rods then define the test area. A thermal load may be applied to one side of the flat panel and a pressure load may be applied to the other side. The novelty of this method is found in providing a testing apparatus which allows mechanical, thermal and pressure loads to be applied simultaneously to a flat panel for testing purposes.

NASA



N92-30099*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

APPARATUS FOR ELEVATED TEMPERATURE COMPRESSION OR TENSION TESTING OF SPECIMENS Patent Application

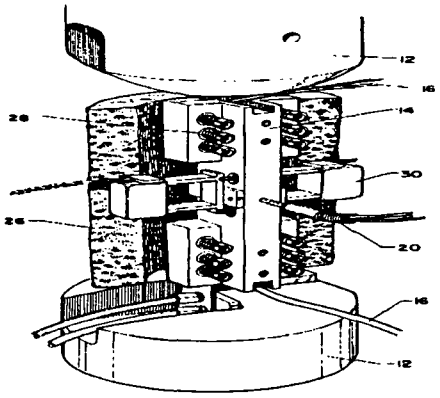
THOMAS S. GATES, inventor (to NASA) 12 May 1992 8 p

(NASA-CASE-LAR-14775-1; NAS 1.71:LAR-14775-1; US-PATENT-APPL-SN-881912) Avail: CASI HC A02/MF A01

In order to support materials selection for the next generation supersonic civilian passenger transport aircraft, a testing apparatus was developed to evaluate certain materials under conditions of high load and elevated temperature. In order to elevate the temperature of

the material during standard tension and compression testing the test specimen is surrounded by a pair of supports which include internal heating means. These supports also prevent buckling of the specimen during compression testing.

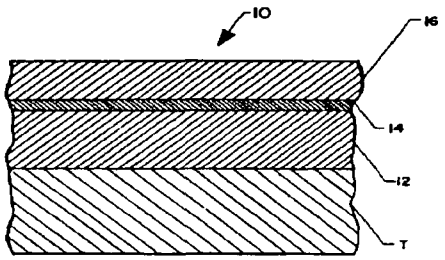
NASA



N92-30317*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
A SHEAR SENSITIVE MONOMER-POLYMER LAMINATE STRUCTURE AND METHOD OF USING SAME Patent Application
JAG J. SINGH, inventor (to NASA), ABE EFTEKHARI, inventor (to NASA) (Hampton Univ., VA.), and DEVENDRA S. PARMAR, inventor (to NASA) (National Academy of Sciences - National Research Council, Hampton, VA.) 2 Mar. 1992 21 p
(NASA-CASE-LAR-14654-1; NAS 1.71:LAR-14654-1; US-PATENT-APPL-SN-849612) Avail: CASI HC A03/MF A01

Monomer cholesteric liquid crystals have helical structures which result in a phenomenon known as selective reflection, wherein incident white light is reflected in such a way that its wavelength is governed by the instantaneous pitch of the helix structure. The pitch is dependent on temperature and external stress fields. It is possible to use such monomers in flow visualization and temperature measurement. However, the required thin layers of these monomers are quickly washed away by a flow, making their application time dependent for a given flow rate. the laminate structure according to the present invention comprises a liquid crystal polymer substrate attached to a test surface of an article. A light absorbing coating is applied to the substrate and is thin enough to permit bonding steric interaction between the liquid crystal polymer substrate and an overlying liquid crystal monomer thin film. Light is directed through and reflected by the liquid crystal monomer thin film and unreflected light is absorbed by the underlying coating. The wavelength of the reflected light is indicative of the shear stress experienced by the test surface. Novel aspects of the invention include its firm bonding of a liquid crystal monomer to a model and its use of a coating to reduce interference from light unreflected by the monomer helical structure.

NASA



N92-34174* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
METHOD OF RECERTIFYING A LOADED BEARING MEMBER Patent
SIDNEY G. ALLISON, inventor (to NASA) 29 Sep. 1992 14 p Filed 19 Jun. 1991 Supersedes N92-12302 (30 - 3, p 406) (NASA-CASE-LAR-14168-1; US-PATENT-5,150,620; US-PATENT-APPL-SN-717755; US-PATENT-CLASS-73-862.59; US-PATENT-CLASS-73-761; INT-PATENT-CLASS-F16B-31/02) Avail: US Patent and Trademark Office

A method is described of recertifying a loaded bearing member using ultrasound testing to compensate for different equipment configurations and temperature conditions. The standard frequency F1 of a reference block is determined via an ultrasonic tone burst generated by a first pulsed phased locked loop (P2L2) equipment configuration. Once a lock point number S is determined for F1, the reference frequency F1a of the reference block is determined at this lock point number via a second P2L2 equipment configuration to permit an equipment offset compensation factor Fo1=((F1-F1a)/F1)(1000000) to be determined. Next, a reference frequency F2 of the unloaded bearing member is determined using a second P2L2 equipment configuration and is then compensated for equipment offset errors via the relationship F2+F2(Fo1)/1000000. A lock point number b is also determined for F2. A resonant frequency F3 is determined for the reference block using a third P2L2 equipment configuration to determine a second offset compensation factor F02=((F1-F3)/F1) 1000000. Next the resonant frequency F4 of the loaded bearing member is measured at lock point number b via the third P2L2 equipment configuration and the bolt load determined by the relationship (-1000000)CI(((F2-F4)/F2)-Fo2), wherein CI is a factor correlating measured frequency shift to the applied load. Temperature compensation is also performed at each point in the process.

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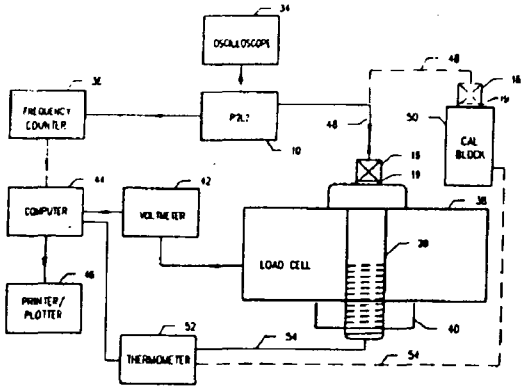


44
ENERGY PRODUCTION AND CONVERSION

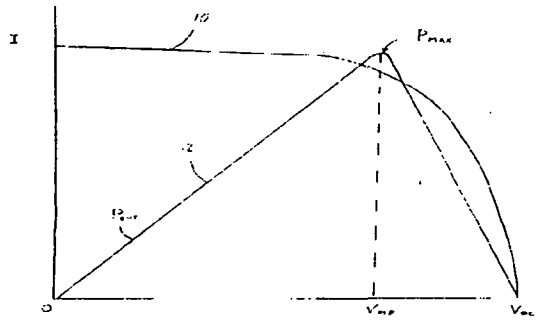
Includes specific energy conversion systems, e.g., fuel cells; global sources of energy; geophysical conversion; and windpower.

N92-23463*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
MICROPROCESSOR CONTROL OF MULTIPLE PEAK POWER TRACKING DC/DC CONVERTERS FOR USE WITH SOLAR CELL ARRAYS Patent Application
MARTIN E. FREDERICK, inventor (to NASA) and JOEL JERMAKIAN, inventor (to NASA) 5 Nov. 1991 21 p

(NASA-CASE-GSC-13450-1; NAS 1.71:GSC-13450-1; US-PATENT-APPL-SN-787993) Avail: CASI HC A03/MF A01

A method and an apparatus is provided for efficiently controlling the power output of a solar cell array string or a plurality of solar cell array strings to achieve a maximum amount of output power from the strings under varying conditions of use. Maximum power output from a solar array string is achieved through control of a pulse width modulated DC/DC buck converter which transfers power from a solar array to a load or battery bus. The input voltage from the solar array to the converter is controlled by a pulse width modulation duty cycle, which in turn is controlled by a differential signal controller. By periodically adjusting the control voltage up or down by a small amount and comparing the power on the load or bus with that generated at different voltage values a maximum power output voltage may be obtained. The system is totally modular and additional solar array strings may be added to the system simply by adding converter boards to the system and changing some constants in the controller's control routines.

NASA



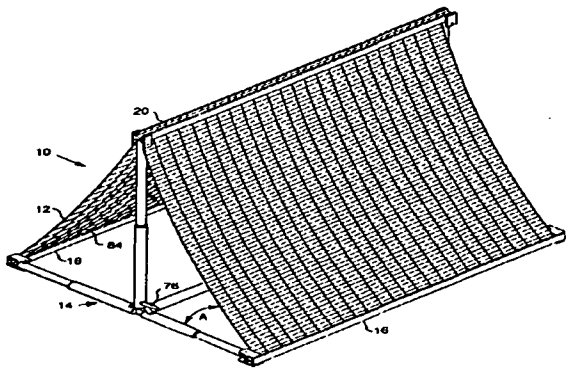
N92-24057*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

SELF-DEPLOYING PHOTOVOLTAIC POWER SYSTEM Patent Application

ANTHONY J. COLOZZA, inventor (to NASA) 2 Apr. 1992 19 p (NASA-CASE-LEW-15308-1; NAS 1.71:LEW-15308-1; US-PATENT-APPL-SN-862113) Avail: CASI HC A03/MF A01

A lightweight flexible photovoltaic (PV) blanket is attached to a support structure of initially stowed telescoping members. The deployment mechanism comprises a series of extendable and rotatable columns. As these columns are extended the PV blanket is deployed to its proper configuration.

NASA



N92-29143* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

SOLAR THERMAL ENERGY RECEIVER Patent

KARL W. BAKER, inventor (to NASA) and MILES O. DUSTIN, inventor (to NASA) 19 May 1992 9 p Filed 27 Mar. 1991 Supersedes N91-23617 (29 - 15, p 2457) (NASA-CASE-LEW-14949-1; US-PATENT-5,113,659; US-PATENT-APPL-SN-676910; US-PATENT-CLASS-60-641.8; US-PATENT-CLASS-60-659; US-PATENT-CLASS-126-433; US-PATENT-CLASS-126-436; INT-PATENT-CLASS-F03G-6/00) Avail: US Patent and Trademark Office

A plurality of heat pipes in a shell receive concentrated solar energy and transfer the energy to a heat activated system. To provide for even distribution of the energy despite uneven impingement of solar energy on the heat pipes, absence of solar energy at times, or failure of one or more of the heat pipes, energy storage means are disposed on the heat pipes which extend through a heat pipe thermal coupling means into the heat activated device. To enhance energy transfer to the heat activated device, the heat pipe coupling cavity means may be provided with extensions into the device. For use with a Stirling engine having passages for working gas, heat transfer members may be positioned to contact the gas and the heat pipes. The shell may be divided into sections by transverse walls. To prevent cavity working fluid from collecting in the extensions, a porous body is positioned in the cavity.

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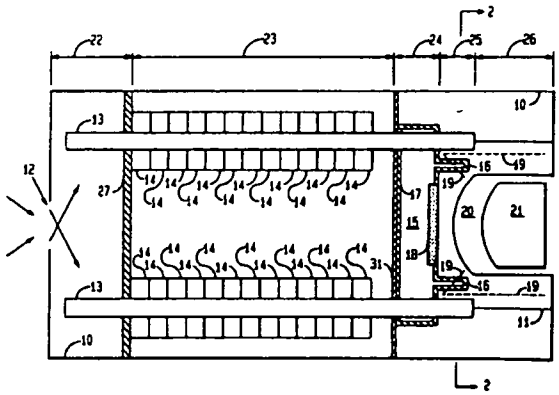


47
METEOROLOGY AND CLIMATOLOGY

Includes weather forecasting and modification.

N92-29148* National Aeronautics and Space Administration. Pasadena Office, CA.

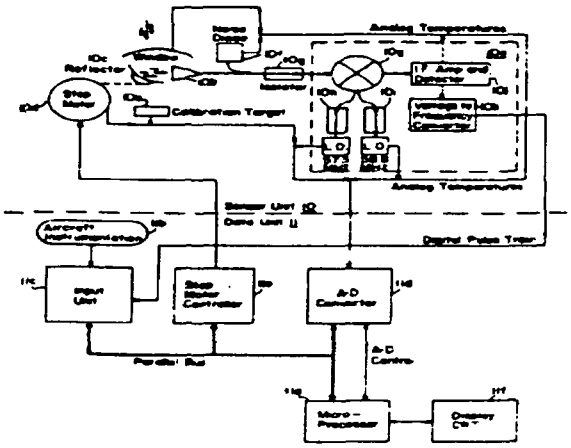
MICROWAVE TEMPERATURE PROFILER FOR CLEAR AIR TURBULENCE PREDICTION Patent

BRUCE L. GARY, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 2 Jun. 1992 16 p Filed 27 Nov. 1990 Supersedes N91-23662 (29 - 15, p 2465) (NASA-CASE-NPO-18115-1-CU; US-PATENT-5,117,689; US-PATENT-APPL-SN-618790; US-PATENT-CLASS-73-178R; US-PATENT-CLASS-364-443; US-PATENT-CLASS-374-112; INT-PATENT-CLASS-G01C-21/00) Avail: US Patent and Trade mark Office

A method is disclosed for determining Richardson Number, Ri, or its reciprocal, RRi, for clear air prediction using measured potential temperature and determining the vertical gradient of potential tem-

perature, d(theta)/dz. Wind vector from the aircraft instrumentation versus potential temperature, dW/D(theta), is determined and multplies by d(theta)/dz to obtain dW/dz. Richardson number or its reciprocal is then determined from the relationship Ri = K(d theta)/dz divided by (dW/dz squared) for use in detecting a trend toward a threshold value for the purpose of predicting clear air turbulence. Other equations for this basic relationship are disclosed together with the combination of other atmospheric observables using multiple regression techniques.

Official Gazette of the U.S. Patent and Trademark Office



51
LIFE SCIENCES (GENERAL)

N92-24052*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.

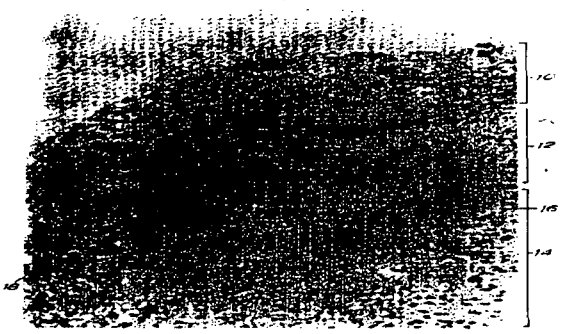
THREE-DIMENSIONAL CULTURED GLIOMA CELL LINES Patent Application

STEVE R. GONDA, inventor (to NASA) and GARRY M. MARLEY, inventor (to NASA) (Krug International, Houston, TX.) 9 Dec. 1991 28 p

(NASA-CASE-MSC-21843-1-NP; NAS 1.71:MSC-21843-1-NP; US-PATENT-APPL-SN-803828) Avail: CASI HC A03/MF A01

Three-dimensional glioma spheroids were produced in vitro with size and histological differentiation previously unattained. The spheroids were grown in liquid media suspension in a Johnson Space Center (JSC) Rotating Wall Bioreactor without using support matrices such as microcarrier beads. Spheroid volumes of greater than 3.5 cu mm and diameters of 2.5 mm were achieved with a viable external layer or rim of proliferating cells, a transitional layer beneath the external layer with histological differentiation, and a degenerative central region with a hypoxic necrotic core. Cell debris was evident in the degenerative central region. The necrotics centers of some of the spheroids had hyaline droplets. Granular bodies were detected predominantly in the necrotic center.

NASA



N92-34229* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.

THREE-DIMENSIONAL CO-CULTURE PROCESS Patent

DAVID A. WOLF, inventor (to NASA) and THOMAS J. GOODWIN, inventor (to NASA) 6 Oct. 1992 6 p Filed 2 Mar. 1989 Supersedes N90-18852 (28 - 11, p 1538) Continuation-in-part of US-Patent-Appl-SN-213558, filed 30 Jun. 1988 and continuation-in-part of US-Patent-Appl-SN-213559, filed 30 Jun. 1988 and continuation-in-part of US-Patent-Appl-SN-317776, filed 2 Mar. 1989

(NASA-CASE-MSC-21560-1; US-PATENT-5,153,132; US-PATENT-APPL-SN-317931; US-PATENT-APPL-SN-213558; US-PATENT-APPL-SN-213559; US-PATENT-APPL-SN-317776; US-PATENT-CLASS-435-240.24; US-PATENT-CLASS-435-3; US-PATENT-CLASS-435-240.25; US-PATENT-CLASS-435-286) Avail: US Patent and Trademark Office

The present invention relates to a 3-dimensional co-culture process, more particularly to methods or co-culturing at least two types of cells in a culture environment, either in space or in unit gravity, with minimum shear stress, freedom for 3-dimensional spatial orientation of the suspended particles and localization of particles with differing or similar sedimentation properties in a similar spatial region to form 3-dimensional tissue-like structures. Several examples of multicellular 3-dimensional experiences are included. The protocol and procedure are also set forth. The process allows simultaneous culture of multiple cell types and supporting substrates in a manner which does not disrupt the 3-dimensional spatial orientation of these components. The co-cultured cells cause a mutual induction effect which mimics the natural hormonal signals and cell interactions found in the intact organism. This causes the tissues to differentiate and form higher 3-dimensional structures such as glands, junctional complexes polypoid geometries, and microvilli which represent the corresponding in-vitro structures to a greater degree than when the cell types are cultured individually or by conventional processes. This process was clearly demonstrated for the case of two epithelial derived colon cancer lines, each co-cultured with normal human fibroblasts and with microcarrier bead substrates. The results clearly demonstrate increased 3-dimensional tissue-like structure and biochemical evidence of an increased differentiation state. With the present invention a variety of cells may be co-cultured to produce tissue which has 3-dimensionality and has some of the characteristics of in-vitro tissue. The process provides enhanced 3-dimensional tissue which create a multicellular organoid differentiation model.

Official Gazette of the U.S. Patent and Trademark Office

N92-34231* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.

THREE-DIMENSIONAL CELL TO TISSUE ASSEMBLY PROCESS Patent

DAVID A. WOLF, inventor (to NASA), RAY P. SCHWARZ, inventor (to NASA), MARIAN L. LEWIS, inventor (to NASA), JOHN H. CROSS, inventor (to NASA), and MARY H. HULS, inventor (to NASA) 13 Oct. 1992 16 p Filed 2 Mar. 1989 Supersedes N91-13860 (29 - 5, p 693) Continuation-in-part of US-Patent-Appl-SN-213558, filed 30 Jun. 1988 and continuation-in-part of US-Patent-Appl-SN-213559, filed 30 Jun. 1988

(NASA-CASE-MSC-21559-1; US-PATENT-5,155,034; US-PATENT-APPL-SN-317776; US-PATENT-APPL-SN-213558; US-PATENT-APPL-SN-213559; US-PATENT-CLASS-435-240.24; US-PATENT-CLASS-435-3; US-PATENT-CLASS-435-240.25; US-PATENT-CLASS-435-286; US-PATENT-CLASS-435-312) Avail: US Patent and Trademark Office

The present invention relates a 3-dimensional cell to tissue and maintenance process, more particularly to methods of culturing cells in a culture environment, either in space or in a gravity field, with

minimum fluid shear stress, freedom for 3-dimensional spatial orientation of the suspended particles and localization of particles with differing or similar sedimentation properties in a similar spatial region.

Official Gazette of the U.S. Patent and Trademark Office

N92-34232* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.

HIGH ASPECT REACTOR VESSEL AND METHOD OF USE Patent

DAVID A. WOLF, inventor (to NASA), CLARENCE F. SAMS, inventor (to NASA), and RAY P. SCHWARZ, inventor (to NASA) 6 Oct. 1992 10 p Filed 11 Dec. 1990 Supersedes N91-17531 (29 - 3, p 313) (NASA-CASE-MSC-21662-1; US-PATENT-5,153,131; US-PATENT-APPL-SN-625345; US-PATENT-CLASS-435-240.240; US-PATENT-CLASS-435-284; US-PATENT-CLASS-435-286; US-PATENT-CLASS-435-311; US-PATENT-CLASS-435-312; US-PATENT-CLASS-435-313; US-PATENT-CLASS-435-315) Avail: US Patent and Trademark Office

An improved bio-reactor vessel and system useful for carrying out mammalian cell growth in suspension in a culture media are presented. The main goal of the invention is to grow and maintain cells under a homogeneous distribution under acceptable biochemical environment of gas partial pressures and nutrient levels without introducing direct agitation mechanisms or associated disruptive mechanical forces. The culture chamber rotates to maintain an even distribution of cells in suspension and minimizes the length of a gas diffusion path. The culture chamber design is presented and discussed.

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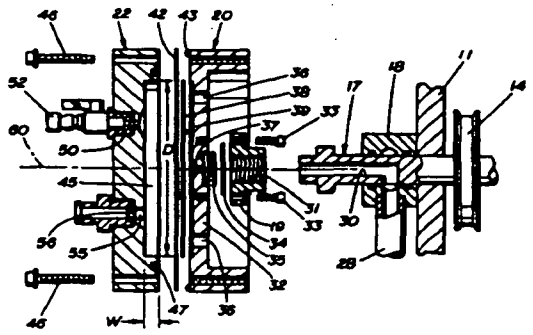


52
AEROSPACE MEDICINE

Includes physiological factors; biological effects of radiation; and effects of weightlessness on man and animals.

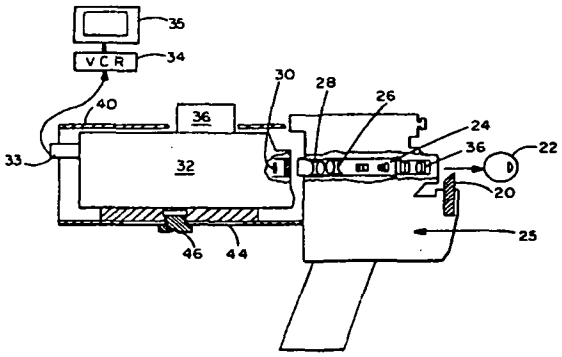
N92-28755* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.

PORTABLE DYNAMIC FUNDUS INSTRUMENT Patent

GERALD R. TAYLOR, inventor (to NASA), RICHARD T. MEEHAN, inventor (to NASA), NORWOOD R. HUNTER, inventor (to NASA), MICHAEL P. CAPUTO, inventor (to NASA), and C. ROBERT GIBSON, inventor (to NASA) 30 Jun. 1992 9 p Filed 29 Jun. 1990 Supersedes N91-13865 (29 - 5, p 694) (NASA-CASE-MSC-21675-1; US-PATENT-5,125,730; US-PATENT-APPL-SN-562095; US-PATENT-CLASS-351-206; US-PATENT-CLASS-351-221; INT-PATENT-CLASS-A61B-3/14) Avail: US Patent and Trademark Office

A portable diagnostic image analysis instrument is disclosed for retinal funduscopy in which an eye fundus image is optically processed by a lens system to a charge coupled device (CCD) which produces recordable and viewable output data and is simultaneously viewable on an electronic view finder. The fundus image is processed to develop a representation of the vessel or vessels from the output data.

Official Gazette of the U.S. Patent and Trademark Office



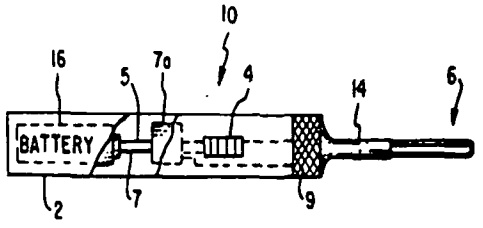
N92-33032* National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.

DEVICE FOR REMOVING FOREIGN OBJECTS FROM ANATOMIC ORGANS Patent

EARL D. ANGULO, inventor (to NASA) 28 Jul. 1992 10 p Filed 19 Mar. 1991 Supersedes N91-28727 (29 - 20, p 3380) (NASA-CASE-GSC-13306-1; US-PATENT-5,133,721; US-PATENT-APPL-SN-674828; US-PATENT-CLASS-606-106; US-PATENT-CLASS-148-402; US-PATENT-CLASS-606-78; US-PATENT-CLASS-606-127; INT-PATENT-CLASS-A61M-1/00) Avail: US Patent and Trademark Office

A device is disclosed for removing foreign objects from anatomic organs such as the ear canal or throat. It has a housing shaped like a flashlight, an electrical power source such as a battery or AC power from a wall socket, and a tip extending from the housing. The tip has at least one wire loop made from a shape-memory-effect alloy, such as Nitinol, switchably connected to the electrical power source such that when electric current flows through the wire loop the wire loop heats up and returns to a previously programmed shape such as a curet or tweezers so as to facilitate removal of the foreign object.

Official Gazette of the U.S. Patent and Trademark Office



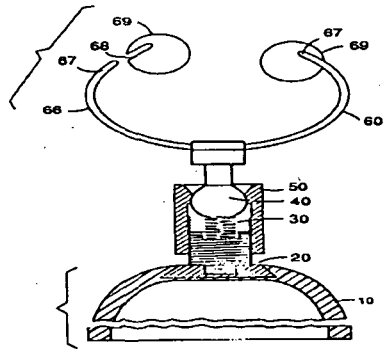
54
MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT

Includes human engineering; biotechnology; and space suits and protective clothing.

N92-24044*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.
PROSTHETIC HELPING HAND Patent Application
THOMAS W. VEST, inventor (to NASA) (MSI Electronics, Inc., Woodside, NY.), JAMES R. CARDEN, inventor (to NASA), WILLIAM E. NORTON, inventor (to NASA), and JEWELL G. BELCHER, inventor (to NASA) 7 Feb. 1992 12 p
(NASA-CASE-MFS-28430-1; NAS 1.71:MFS-28430-1; US-PATENT-APPL-SN-832569) Avail: CASI HC A03/MF A01

A prosthetic device for below-the-elbow amputees, having a C-shaped clamping mechanism for grasping cylindrical objects, is described. The clamping mechanism is pivotally mounted to a cuff that fits on the amputee's lower arm. The present invention is utilized by placing an arm that has been amputated below the elbow into the cuff. The clamping mechanism then serves as a hand whenever it becomes necessary for the amputee to grasp a cylindrical object such as a handle, a bar, a rod, etc. To grasp the cylindrical object, the object is jammed against the opening in the C-shaped spring, causing the spring to open, the object to pass to the center of the spring, and the spring to snap shut behind the object. Various sizes of clamping mechanisms can be provided and easily interchanged to accommodate a variety of diameters. With the extension that pivots and rotates, the clamping mechanism can be used in a variety of orientations. Thus, this invention provides the amputee with a clamping mechanism that can be used to perform a number of tasks.

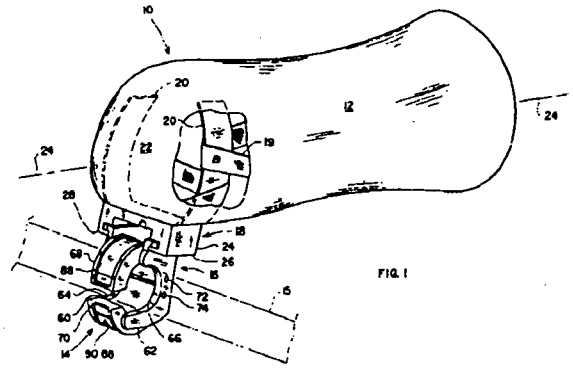
NASA



N92-24056*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.
BAR-HOLDING PROSTHETIC LIMB Patent Application
THOMAS W. VEST, inventor (to NASA) (MSI Electronics, Inc., Woodside, NY.), WILLIAM E. NORTON, inventor (to NASA), JEWELL G. BELCHER, inventor (to NASA), and JAMES R. CARDEN, inventor (to NASA) 15 Apr. 1992 11 p
(NASA-CASE-MFS-28481-1; NAS 1.71:MFS-28481-1; US-PATENT-APPL-SN-873931) Avail: CASI HC A03/MF A01

A prosthetic device for below-the-elbow amputees is disclosed. The device has a removable effector, which is attached to the end of an arm cuff. The effector is comprised of a pair of C-shaped members that are oriented so as to face each other. Working in concert, the C-shaped members are able to hold a bar such as a chainsaw handle. A flat spring is fitted around the C-shaped members to hold them together.

NASA



N92-29129* National Aeronautics and Space Administration. Pasadena Office, CA.
METHOD AND APPARATUS FOR PREDICTING THE DIRECTION OF MOVEMENT IN MACHINE VISION Patent
TERI B. LAWTON, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 28 Apr. 1992 16 p Filed 30 Sep. 1988
(NASA-CASE-NPO-17552-1-CU; US-PATENT-5,109,425; US-PATENT-APPL-SN-251500; US-PATENT-CLASS-382-1; US-PATENT-CLASS-358-105; US-PATENT-CLASS-364-424.01; US-PATENT-CLASS-382-22; US-PATENT-CLASS-901-1; INT-PATENT-CLASS-G06K-9/00) Avail: US Patent and Trademark Office

A computer-simulated cortical network is presented. The network is capable of computing the visibility of shifts in the direction of movement. Additionally, the network can compute the following: (1) the magnitude of the position difference between the test and background patterns; (2) localized contrast differences at different spatial scales analyzed by computing temporal gradients of the difference and sum of the outputs of paired even- and odd-symmetric bandpass filters convolved with the input pattern; and (3) the direction of a test pattern moved relative to a textured background. The direction of movement of an object in the field of view of a robotic vision system is detected in accordance with nonlinear Gabor function algorithms. The movement of objects relative to their background is used to infer the 3-dimensional structure and motion of object surfaces.

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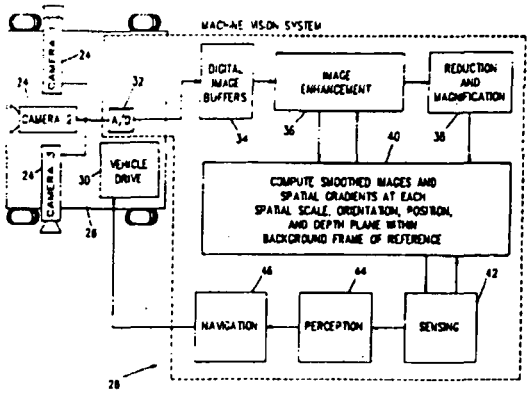


N92-29137* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
WHOLE BODY CLEANING AGENT CONTAINING N-ACYLTAURATE Patent
STEVEN E. LENTSCH, inventor (to NASA) 26 May 1992 5 p Filed 29 May 1990 Supersedes N91-16566 (29 - 8, p 1195) (NASA-CASE-MSC-21589-1; US-PATENT-5,116,543; US-PATENT-APPL-SN-529427; US-PATENT-CLASS-252-545; US-PATENT-CLASS-252-547; US-PATENT-CLASS-252-DIG.5; US-PATENT-CLASS-252-DIG.14; US-PATENT-CLASS-252-DIG.13; US-PATENT-CLASS-424-70; US-PATENT-CLASS-4-661) Avail: US Patent and Trademark Office

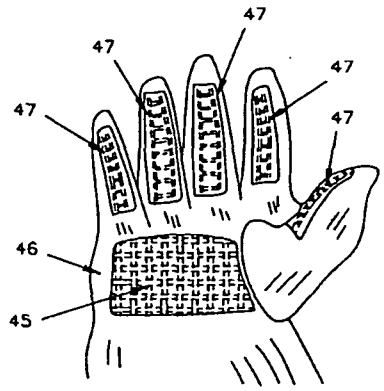
The subject invention relates to a human cleansing agent particularly suitable for use in long duration spaceflight and to a method of bathing with the agent. The agent of the subject invention is in the form of a paste having a pH of 5.0 to 7.9 which comprises an acyltaurate, a skin conditioner, a hair conditioner, and a preservative. More specifically, it includes sodium N-coconut acid-N-methyl taurate, in combination with soybean lecithin, polyquaternium 16, and formalin. This particular combination satisfies the following objectives: (1) that it be usable with a minimum amount of water per shower (approximately 1 gallon); (2) that it be easily separated from the water for purposes of water reclamation; (3) that it be pH compatible with skin and hair; (4) that it rinse well in deionized water; (5) that it be mild to skin and eyes; (6) that it effectively clean both skin and hair; (7) that it be suitable for use in zero gravity; and (8) that it provide ease of combing of wet and dry hair. The method of the invention includes the steps of wetting the skin and hair with a small quantity of water, lathering the skin with the paste, rinsing the lather from the skin and hair with a small quantity of water to produce a rinse water containing the cleansing agent, defoaming the rinse water, and supplying the defoamed rinse water to a water reclamation unit for recycling the water. The novelty of the invention appears to lie in the particular formulation of the cleansing agent and its method of use which provide optimal results under the given constraints and objectives.

Official Gazette of the U.S. Patent and Trademark Office

N92-34210*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
GLOVE ATTACHMENT Patent Application
FREDERIC DAWN, inventor (to NASA), WALTER GUY, inventor (to NASA), JOSEPH KOSMO, inventor (to NASA), ARTHUR DRENNAN, inventor (to NASA) (Little, Arthur D., Inc., Cambridge, MA), and RICHARD TSCHIRCH, inventor (to NASA) (Little, Arthur D., Inc., Cambridge, MA) 14 Aug. 1992 13 p
(NASA-CASE-MSC-21632-1; NAS 1.71:MSC-21632-1; US-PATENT-APPL-SN-929556) Avail: CASI HC A03/MF A01

An attachment principally for the palm of an astronaut glove to enhance the gripping area of the palm without detracting from the flexibility and utility of the glove is presented. The attachment is a composite construction formed from a layer of silicone rubber having an outer surface with a friction configuration and another layer of silicone rubber in which a Nomex Aramid mesh fabric is embedded prior to curing. The method of construction involves the use of a mold with a friction configuration surface. A first layer of silicone rubber or sealant is disposed in the mold and allowed to set for an hour. A second layer of silicone rubber or sealant is layered over the firs layer and leveled. A Nomex Aramid mesh fabric is embedded into the second layer and the composite is permitted to cure. When cured, a configured area of the composite construction is glued or stitched to the palm area of the glove.

NASA



60
COMPUTER OPERATIONS AND HARDWARE

Includes hardware for computer graphics, firmware, and data processing.

N92-23546*# National Aeronautics and Space Administration. Pasadena Office, CA.
OPTICAL INNER PRODUCT NEURAL ASSOCIATIVE MEMORY Patent Application
HUA-KUANG LIU, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 26 Nov. 1991 20 p
(Contract NAS7-918)
(NASA-CASE-NPO-18491-1-CU; NAS 1.71:NPO-18491-1-CU; US-PATENT-APPL-SN-880210) Avail: CASI HC A03/MF A01

An optical implementation of an inner-product neural associative memory is realized with a first spatial light modulator for entering an initial two dimensional n-tuple vector and for entering a threshold output vector image after each iteration until convergence is reached, and a second spatial light modulator for entering M weighted vectors of inner-product scalars multiplied with each of the M stored vectors, where the inner-product scalars are produced by multiplication of the initial input vector in the first iterative cycle (and threshold vectors in subsequent iterative cycles) with each of the M stored vectors, and the weighted vectors are produced by multiplication of the scalars with corresponding ones of the stored vectors. A Hughes liquid crystal light valve is used for the dual function of summing the weighted vectors and thresholding the sum vector. The threshold vector is then entered through the first spatial light modulator for reiteration of the process cycle until convergence is reached.

NASA

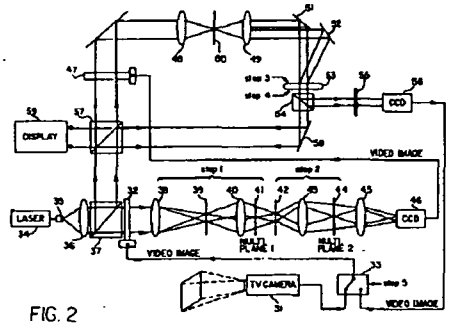


FIG. 2

N92-29132* National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.

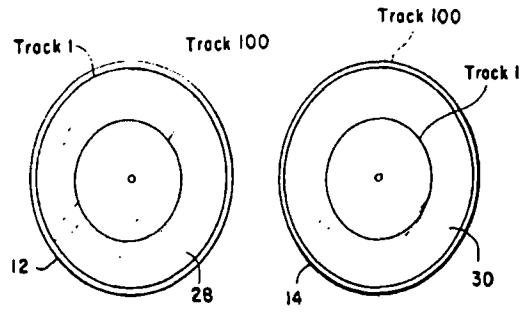
DISK MEMORY DEVICE Patent

RONALD M. MULLER, inventor (to NASA) 5 May 1992 7 p Filed 26 May1989

(NASA-CASE-GSC-13196-1; US-PATENT-5,111,345; US-PATENT-APPL-SN-357928; US-PATENT-CLASS-360-48; US-PATENT-CLASS-369-32; US-PATENT-CLASS-369-95; US-PATENT-CLASS-360-98.01; INT-PATENT-CLASS-G11B-5/09; INT-PATENT-CLASS-G11B-17/22; INT-PATENT-CLASS-G11B-3/74) Avail: US Patent and Trademark Office

A disk memory device is discussed. The device will maximize the storage capacity of a memory disk and at the same time will maximize the record and playback data rate. Two recording disks are mounted upon a common shaft that is rotated at a fixed speed. Each disk has a recording area including a surface upon which data can be recorded/read in the form of tracks arranged either in concentric tracks or in a spiral. The recording area surfaces are divided into multiple concentric track groups. Two read/write heads and two head positioning servos are mounted such that each disk recording surface can be read out or written by the read/write heads. Each track of the multiple track groups of the first disk are given designated numbers beginning with the outer track of the outermost or edge track group and continuing in higher consecutive numbers until the inner track of the innermost track group is designated. However, each track of the multiple track groups of the second disk are given designated numbers in the exact reverse order of the first disk, such that the combined length of a track from the first disk, when added to the length of the same numbered track of the second disk is a constant, generating a constant data rate for the disk memory device.

Official Gazette of the U.S. Patent and Trademark Office



N92-30541*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

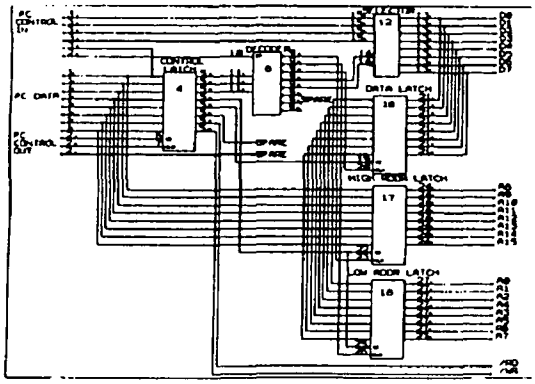
PRINTER PORT INTERFACE Patent Application

JERRY H. TUCKER, inventor (to NASA) and ANN B. YADLOWSKY, inventor (to NASA) (National Academy of Sciences - National Research Council, Hampton, VA.) 1 Jun. 1992 13 p

(NASA-CASE-LAR-13950-1; NAS 1.71:LAR-13950-1; US-PATENT-APPL-SN-891604) Avail: CASI HC A03/MF A01

A printer port interface is provided which converts the printer port on a personal computer to a general purpose bus so that a number of external devices or microprocessor peripheral integrated circuits may be connected to a personal computer via the printer port on the personal computer. This interface enables the printer port to emulate a simple 8 bit microprocessor. The interface device connects the external device to the personal computer and in write mode, received data from the personal computer, signals the external device to accept the information, and sends the data to the external device and in read mode signals the external device to provide data, receives data from the external device and sends the data in amounts which do not exceed the input limits of the printer port to the personal computer.

NASA



N92-33057* National Aeronautics and Space Administration. Pasadena Office, CA.

AUTO AND HETERO-ASSOCIATIVE MEMORY USING A 2-D OPTICAL LOGIC GATE Patent

TIEN-HSIN CHAO, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 14 Jul. 1992 9 p Filed 16 Feb. 1990 Supersedes N91-13888 (29 - 5, p 698)

(NASA-CASE-NPO-17997-1-CU; US-PATENT-5,131,055; US-PATENT-APPL-SN-481013; US-PATENT-CLASS-382-32; US-PATENT-CLASS-382-31; US-PATENT-CLASS-365-49; US-PATENT-CLASS-359-107; US-PATENT-CLASS-359-108; US-PATENT-CLASS-359-559; US-PATENT-CLASS-359-561) Avail: US Patent and Trademark Office

An optical system for auto-associative and hetero-associative recall utilizing Hamming distance as the similarity measure between a binary input image vector V(sup k) and a binary image vector V(sup m) in a first memory array using an optical Exclusive-OR gate for multiplication of each of a plurality of different binary image vectors in memory by the input image vector. After integrating the light of each product V(sup k) x V(sup m), a shortest Hamming distance detection electronics module determines which product has the lowest light intensity and emits a signal that activates a light emitting diode to illuminate a corresponding image vector in a second memory array for display. That corresponding image vector is identical to the memory image vector V(sup m) in the first memory array for auto-associative recall or related to it, such as by name, for hetero-associative recall.

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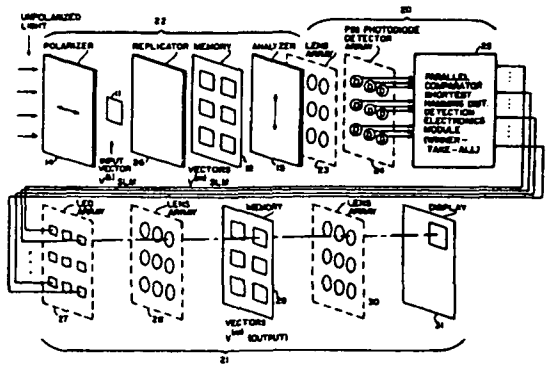
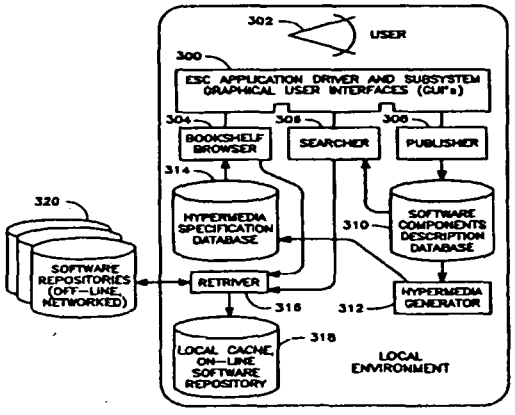


61
COMPUTER PROGRAMMING AND SOFTWARE

Includes computer programs, routines, and algorithms, and specific applications, e.g., CAD/CAM.

N92-30543*# National Aeronautics and Space Administration. Pasadena Office, CA.
ENCYCLOPEDIA OF SOFTWARE COMPONENTS Patent Application
LLOYD VANWARREN, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) and BRIAN C. BECKMAN, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 13 Nov. 1991 52 p
(Contract NAS7-918)
(NASA-CASE-NPO-18435-1-CU; NAS 1.71:NPO-18435-1-CU; US-PATENT-APPL-SN-792501) Avail: CASI HC A04/MF A01

Intelligent browsing through a collection of reusable software components is facilitated with a computer having a video monitor and a user input interface such as a keyboard or a mouse for transmitting user selections, by presenting a picture of encyclopedia volumes with respective visible labels referring to types of software, in accordance with a metaphor in which each volume includes a page having a list of general topics under the software type of the volume and pages having lists of software components for each one of the generic topics, altering the picture to open one of the volumes in response to an initial user selection specifying the one volume to display on the monitor a picture of the page thereof having the list of general topics and altering the picture to display the page thereof having a list of software components under one of the general topics in response to a next user selection specifying the one general topic, and then presenting a picture of a set of different informative plates depicting different types of information about one of the software components in response to a further user selection specifying the one component.
NASA

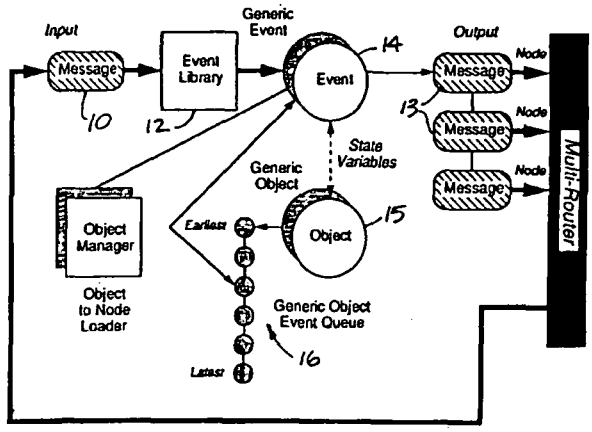


62
COMPUTER SYSTEMS

Includes computer networks and special application computer systems.

N92-24045*# National Aeronautics and Space Administration. Pasadena Office, CA.
SYNCHRONOUS PARALLEL SYSTEM FOR EMULATION AND DISCRETE EVENT SIMULATION Patent Application
JEFFREY S. STEINMAN, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 21 Jan. 1992 52 p
(Contract NAS7-918)
(NASA-CASE-NPO-18414-1-CU; NAS 1.71:NPO-18414-1-CU; US-PATENT-APPL-SN-880211) Avail: CASI HC A04/MF A01

A synchronous parallel system for emulation and discrete event simulation having parallel nodes responds to received messages at each node by generating event objects having individual time stamps, stores only the changes to state variables of the simulation object attributable to the event object, and produces corresponding messages. The system refrains from transmitting the messages and changing the state variables while it determines whether the changes are superseded, and then stores the unchanged state variables in the event object for later restoral to the simulation object if called for. This determination preferably includes sensing the time stamp of each new event object and determining which new event object has the earliest time stamp 30 63 CYBERNETICS as the local event horizon, determining the earliest local event horizon of the nodes as the global event horizon, and ignoring the events whose time stamps are less than the global event horizon. Host processing between the system and external terminals enables such a terminal to query, monitor, command or participate with a simulation object during the simulation process.
NASA



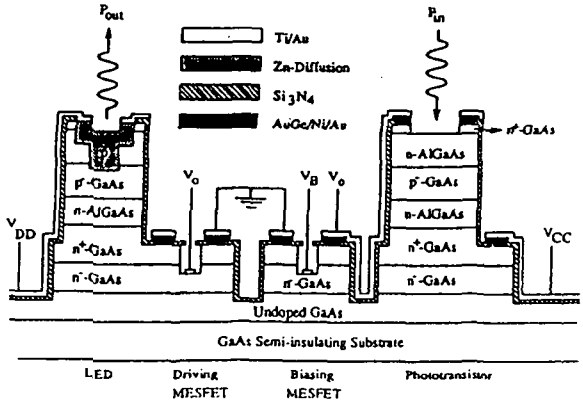
63
CYBERNETICS

Includes feedback and control theory, artificial intelligence, robotics and expert systems.

N92-24245*# National Aeronautics and Space Administration. Pasadena Office, CA.
GAAS-BASED OPTOELECTRONIC NEURONS Patent Application
STEVEN H. LIN, inventor (to NASA), JAE H. KIM, inventor (to NASA), and DEMETRI PSALTIS, inventor (to NASA) (Jet Propulsion Lab.,\ California Inst. of Tech., Pasadena.) 3 Mar. 1992 21 p
(Contract NAS7-918)
(NASA-CASE-NPO-18497-1-CU; NAS 1.71:NPO-18497-1-CU; US-PATENT-APPL-SN-845283) Avail: CASI HC A03/MF A01

An integrated, optoelectronic, variable thresholding neuron implemented monolithically in GaAs integrated circuit and exhibiting high differential optical gain and low power consumption is presented. Two alternative embodiments each comprise an LED monolithically integrated with a detector and two transistors. One of the transistors is responsive to a bias voltage applied to its gate for varying the threshold of the neuron. One embodiment is implemented as an LED monolithically integrated with a double heterojunction bipolar phototransistor (detector) and two metal semiconductor field effect transistors (MESFET's) on a single GaAs substrate and another embodiment is implemented as an LED monolithically integrated with three MESFET's (one of which is an optical FET detector) on a single GaAs substrate. The first noted embodiment exhibits a differential optical gain of 6 and an optical switching energy of 10 pJ. The second embodiment has a differential optical gain of 80 and an optical switching energy of 38 pJ. Power consumption is 2.4 and 1.8 mW, respectively. Input 'light' power needed to turn on the LED is 2 mW and 54 nW, respectively. In both embodiments the detector is in series with a biasing MESFET and saturates the other MESFET upon detecting light above a threshold level. The saturated MESFET turns on the LED. Voltage applied to the biasing MESFET gate controls the threshold.

NASA



N92-29955*# National Aeronautics and Space Administration. Pasadena Office, CA.

ELECTRONIC NEURAL NETWORK FOR SOLVING TRAVELING SALESMAN AND SIMILAR GLOBAL OPTIMIZATION PROBLEMS Patent Application

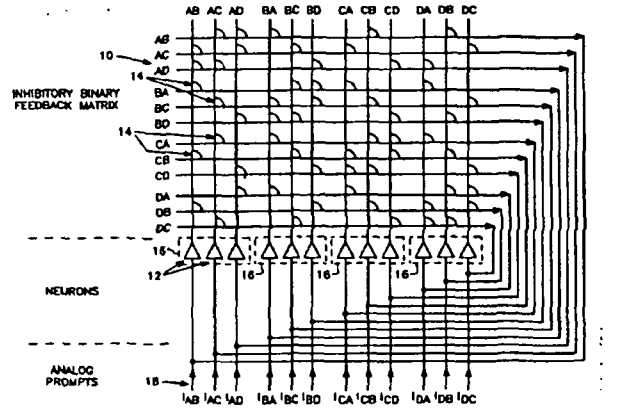
ANIL P. THAKOOR, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.), ALEXANDER W. MOOPENN, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.), TUAN A. DUONG, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.), and SILVIO P. EBERHARDT, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 8 Nov. 1991 27 p

(Contract NAS7-918)

(NASA-CASE-NPO-17807-2-CU; NAS 1.71:NPO-17807-2-CU; US-PATENT-APPL-SN-789567) Avail: CASI HC A03/MF A01

This invention is a novel high-speed neural network based processor for solving the 'traveling salesman' and other global optimization problems. It comprises a novel hybrid architecture employing a binary synaptic array whose embodiment incorporates the fixed rules of the problem, such as the number of cities to be visited. The array is prompted by analog voltages representing variables such as distances. The processor incorporates two interconnected feedback networks, each of which solves part of the problem independently and simultaneously, yet which exchange information dynamically.

NASA



N92-30085*# National Aeronautics and Space Administration. Pasadena Office, CA.

FAST TEMPORAL NEURAL LEARNING USING TEACHER FORCING Patent Application

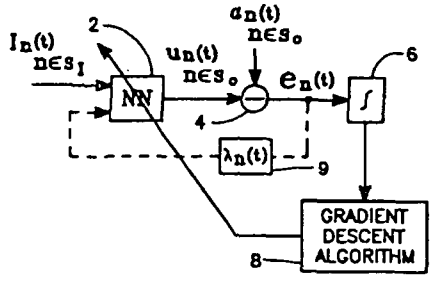
NIKZAD TOOMARIAN, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) and JACOB BAHREN, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 29 Jun. 1992 34 p

(Contract NAS7-918)

(NASA-CASE-NPO-18553-1-CU; NAS 1.71:NPO-18553-1-CU; US-PATENT-APPL-SN-908677) Avail: CASI HC A03/MF A01

A neural network is trained to output a time dependent target vector defined over a predetermined time interval in response to a time dependent input vector defined over the same time interval by applying corresponding elements of the error vector, or difference between the target vector and the actual neuron output vector, to the inputs of corresponding output neurons of the network as corrective feedback. This feedback decreases the error and quickens the learning process, so that a much smaller number of training cycles are required to complete the learning process. A conventional gradient descent algorithm is employed to update the neural network parameters at the end of the predetermined time interval. The foregoing process is repeated in repetitive cycles until the actual output vector corresponds to the target vector. In the preferred embodiment, as the overall error of the neural network output decreasing during successive training cycles, the portion of the error fed back to the output neurons is decreased accordingly, allowing the network to learn with greater freedom from teacher forcing as the network parameters converge to their optimum values. The invention may also be used to train a neural network with stationary training and target vectors.

NASA



N92-30314*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.

A SPACE-TIME NEURAL NETWORK FOR PROCESSING BOTH SPACIAL AND TEMPORAL DATA Patent Application

JAMES A. VILLARREAL, inventor (to NASA) and ROBERT O. SHELTON, inventor (to NASA) 26 Dec. 1991 59 p (NASA-CASE-MSC-21874-1; NAS 1.71:MSC-21874-1; US-PATENT-APPL-SN-813556) Avail: CASI HC A04/MF A01

Neural networks are computing systems modeled after the paradigm of the biological brain. For years, researchers using various forms of neural networks have attempted to model the brain's information processing and decision-making capabilities. Neural network algorithms have impressively demonstrated the capability of modeling spatial information. On the other hand, the application of parallel distributed models to the processing of temporal data has been severely restricted. The invention introduces a novel technique which adds the dimension of time to the well known back-propagation neural network algorithm. In the space-time neural network disclosed herein, the synaptic weights between two artificial neurons (processing elements) are replaced with an adaptable-adjustable filter. Instead of a single synaptic weight, the invention provides a plurality of weights representing not only association, but also temporal dependencies. In this case, the synaptic weights are the coefficients to the adaptable digital filters. Novelty is believed to lie in the disclosure of a processing element and a network of the processing elements which are capable of processing temporal as well as spacial data.

NASA

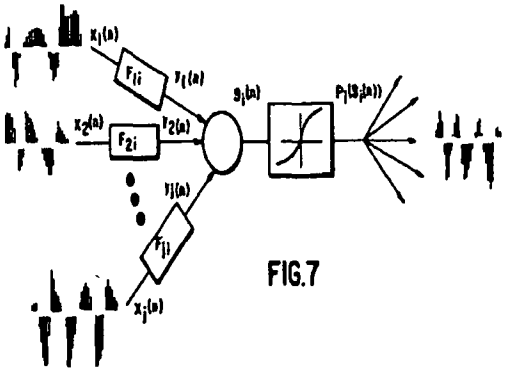


FIG.7

N92-33019* National Aeronautics and Space Administration. Pasadena Office, CA.

OBSTACLE AVOIDANCE FOR REDUNDANT ROBOTS USING CONFIGURATION CONTROL Patent

HOMAYOUN SERAJI, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.), RICHARD D. COLBAUGH, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.), KRISTIN L. GLASS, inventor (to NASA) Jet Propulsion Lab., California Inst. of Tech., Pasadena.) et al. 22 Sep. 1992 8 p Filed 19 Nov. 1990 Supersedes N91-23783 (29 - 15, p 2489) (NASA-CASE-NPO-17852-1-CU; US-PATENT-5,150,026; US-PATENT-APPL-SN-615668; US-PATENT-CLASS-318-568.11; US-PATENT-CLASS-318-567; US-PATENT-CLASS-318-568.19; US-PATENT-CLASS-364-191; US-PATENT-CLASS-901-47; US-PATENT-CLASS-395-90; INT-PATENT-CLASS-G05B-19/42) Avail: US Patent and Trademark Office

A redundant robot control scheme is provided for avoiding obstacles in a workspace during the motion of an end effector along a preselected trajectory by stopping motion of the critical point on the robot closest to the obstacle when the distance between is reduced to a predetermined sphere of influence surrounding the obstacle. Algorithms are provided for conveniently determining the critical point and critical distance.

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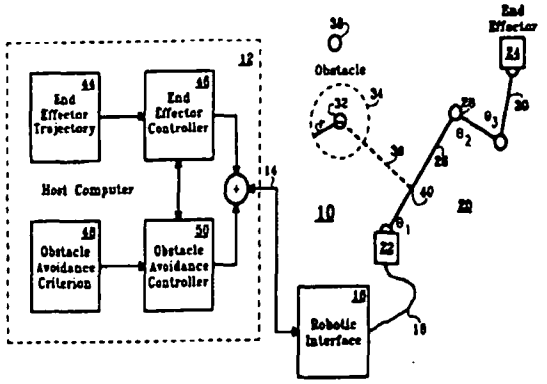


N92-34240*# National Aeronautics and Space Administration. Pasadena Office, CA.

CASCADED VLSI NEURAL NETWORK ARCHITECTURE FOR ON-LINE LEARNING Patent Application

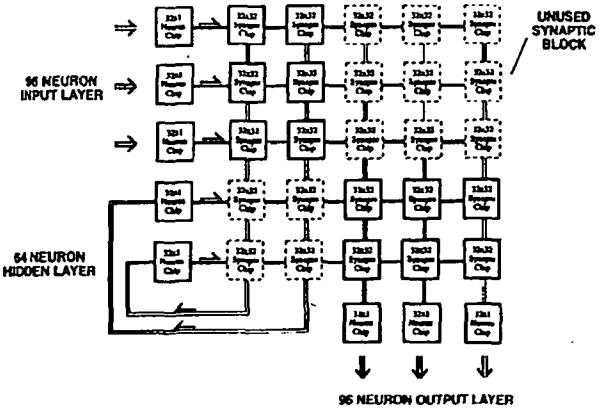
ANILKUMAR P. THAKOOR, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.), TUAN A. DUONG, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.), and TAHER DAUD, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 4 Sep. 1992 45 p

(Contract NAS7-918)

(NASA-CASE-NPO-18645-1-CU; NAS 1.71:NPO-18645-1-CU; US-PATENT-APPL-SN-941335) Avail: CASI HC A03/MF A01

High-speed, analog, fully-parallel, and asynchronous building blocks are cascaded for larger sizes and enhanced resolution. A hardware compatible algorithm permits hardware-in-the-loop learning despite limited weight resolution. A computation intensive feature classification application was demonstrated with this flexible hardware and new algorithm at high speed. This result indicates that these building block chips can be embedded as an application specific coprocessor for solving real world problems at extremely high data rates.

NASA



70
PHYSICS (GENERAL)

N92-29130* National Aeronautics and Space Administration. Pasadena Office, CA.

PRECISION MEASUREMENT OF MAGNETIC CHARACTERISTICS OF AN ARTICLE WITH NULLIFICATION OF EXTERNAL MAGNETIC FIELDS Patent

SHAWN B. HONESS, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.), PABLO NARVAEZ, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.), and JAMES M. MCAULEY, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 30 Jun. 1992 14 p Filed 27 Nov. 1990

(NASA-CASE-NPO-18187-1-CU; US-PATENT-5,126,669; US-PATENT-APPL-SN-618789; US-PATENT-CLASS-324-261; US-PATENT-CLASS-324-244; US-PATENT-CLASS-324-205; US-PATENT-CLASS-361-148; US-PATENT-CLASS-361-149; US-PATENT-CLASS-361-267; INT-PATENT-CLASS-G01N-27/72) Avail: US Patent and Trademark Office

An apparatus for characterizing the magnetic field of a device under test is discussed. The apparatus is comprised of five separate devices: (1) a device for nullifying the ambient magnetic fields in a test environment area with a constant applied magnetic field; (2) a device for rotating the device under test in the test environment area; (3) a device for sensing the magnetic field (to obtain a profile of the magnetic field) at a sensor location which is along the circumference of rotation; (4) a memory for storing the profiles; and (5) a processor coupled to the memory for characterizing the magnetic field of the device from the magnetic field profiles thus obtained.

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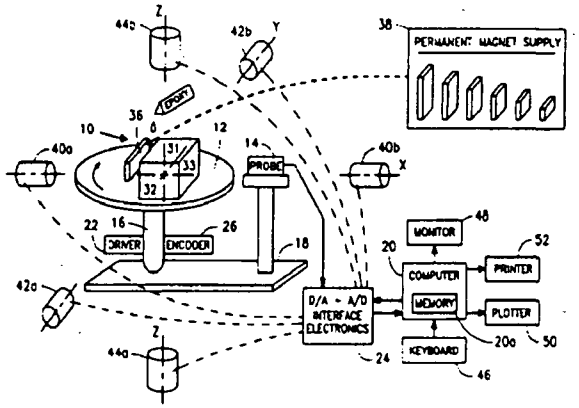

74
OPTICS

Includes light phenomena; and optical devices.

N92-23551*# National Aeronautics and Space Administration. Pasadena Office, CA.

ELECTRO-OPTIC RESONANT PHASE MODULATOR Patent Application CHIEN-CHUNG CHEN, inventor (to NASA), HAMID HEMMATI, inventor (to NASA), and DEBORAH L. ROBINSON, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 26 Feb. 1992 37 p

(Contract NAS7-918)

(NASA-CASE-NPO-18702-1-CU; NAS 1.71:NPO-18702-1-CU; US-PATENT-APPL-SN-842300) Avail: CASI HC A03/MF A01

An electro-optic resonant cavity is used to achieve phase modulation with lower driving voltages. Laser damage thresholds are inherently higher than with previously used integrated optics due to the utilization of bulk optics. Phase modulation is achieved at higher speeds with lower driving voltages than previously obtained with non-resonant electro-optic phase modulators. The instant scheme uses a data locking dither approach as opposed to the conventional sinusoidal locking schemes. In accordance with a disclosed embodiment, a resonant cavity modulator has been designed to operate at a data rate in excess of 100 megabits per sec. By carefully choosing the cavity finesse and its dimension, it is possible to control the pulse switching time to within 4 nano-sec. and to limit the required switching voltage to within 10 V. This cavity locking scheme can be applied by using only the random data sequence, and without the need of dithering of the cavity. Compared to waveguide modulators, the resonant cavity has a comparable modulating voltage requirement. Because of its bulk geometry, the resonant cavity modulator has the potential of accommodating higher throughput power. Mode matching into the bulk device is easier and typically can be achieved with higher efficiency. An additional control loop is incorporated into the modulator to maintain the cavity on resonance.

NASA

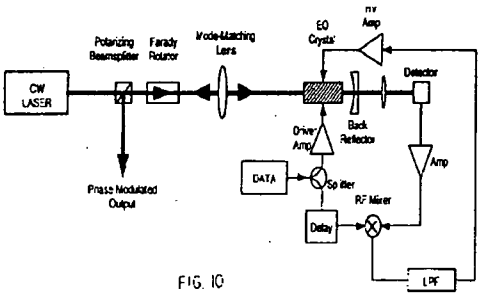

FIG. 10

N92-28571* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

MONOLITHIC MM-WAVE PHASE SHIFTER USING OPTICALLY ACTIVATED SUPERCONDUCTING SWITCHES Patent

ROBERT R. ROMANOFSKY, inventor (to NASA) and KUL B. BHASIN, inventor (to NASA) 26 May 1992 6 p Filed 25 Sep. 1990 Supersedes N91-13996 (29 - 5, p 716)

(NASA-CASE-LEW-14878-1; US-PATENT-5,116,807; US-PATENT-APPL-SN-587921; US-PATENT-CLASS-505-1; US-PATENT-CLASS-505-703; US-PATENT-CLASS-505-848; US-PATENT-CLASS-505-866; US-PATENT-CLASS-333-161; US-PATENT-CLASS-333-995; INT-PATENT-CLASS-H01P-1/18) Avail: US Patent and Trademark Office

A phase shifter is disclosed having a reference path and a delay path, light sources, and superconductive switches. Each of the superconductive switches is terminated in a virtual short circuit, which may be a radial stub. Switching between the reference path and delayed path is accomplished by illuminating the superconductive switches connected to the desired path, while not illuminating the superconductive switches connected to the other path.

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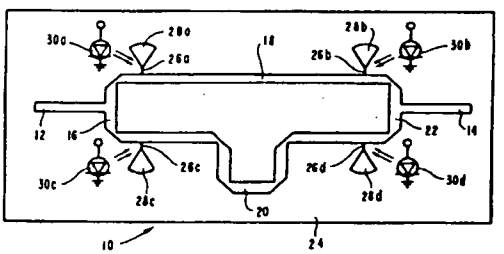

N92-29117* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

NON-MECHANICAL OPTICAL PATH SWITCHING AND ITS APPLICATION TO DUAL BEAM SPECTROSCOPY INCLUDING GAS FILTER CORRELATION RADIOMETRY Patent

GLEN W. SACHSE, inventor (to NASA) and LIANG-GUO WANG, inventor (to NASA) 7 Jul. 1992 11 p Filed 11 Feb. 1991 Supersedes N91-23889 (29 - 15, p 2507)

(NASA-CASE-LAR-14588-1-CU; US-PATENT-5,128,797; US-PATENT-APPL-SN-653605; US-PATENT-CLASS-359-246; US-PATENT-CLASS-356-370; US-PATENT-CLASS-356-414; US-PATENT-CLASS-359-247; US-PATENT-CLASS-359-281; INT-PATENT-CLASS-G02F-1/01) Avail: US Patent and Trademark Office

A non-mechanical optical switch is developed for alternately switching a monochromatic or quasi-monochromatic light beam along two optical paths. A polarizer polarizes light into a single, e.g., vertical component which is then rapidly modulated into vertical and horizontal components by a polarization modulator. A polarization beam splitter then reflects one of these components along one path and transmits the other along the second path. In the specific application of gas filter correlation radiometry, one path is directed through a vacuum cell and one path is directed through a gas correlation cell containing a desired gas. Reflecting mirrors cause these two paths to intersect at a second polarization beam splitter which reflects one component and transmits the other to recombine them into a polarization modulated beam which can be detected by an appropriate single sensor.

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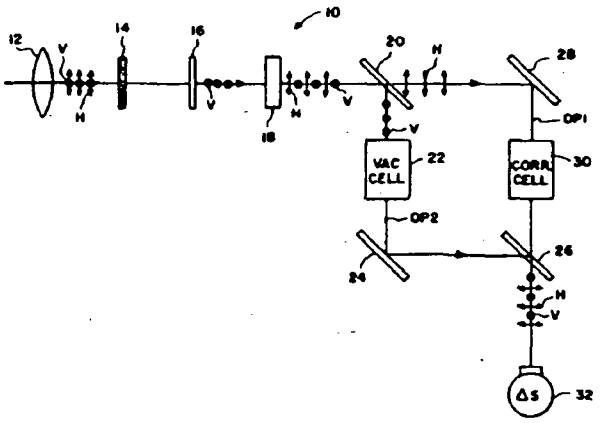

N92-29122* National Aeronautics and Space Administration. Pasadena Office, CA.

METHOD AND APPARATUS FOR PHASING SEGMENTED MIRROR ARRAYS Patent

PAUL K. MANHART, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 12 May 1992 10 p Filed 6 Mar. 1991 Supersedes N91-32923 (29 - 24, p 4102)

(NASA-CASE-NPO-18095-1-CU; US-PATENT-5,113,064; US-PATENT-APPL-SN-665509; US-PATENT-CLASS-250-201.9; US-PATENT-CLASS-359.849; INT-PATENT-CLASS-G01J-1/20) Avail: US Patent and Trademark Office

A method and an apparatus are disclosed for edge phasing an array of segments in a segmented primary telescope mirror using white light from a far field source and starting with the inner edge of each segment in the first ring of segments. The segments are individually phased for zero piston and tilt error with respect to the edge of a reference surface in the open center position of the telescope mirror. After edge phasing of all segments in the telescope mirror array is completed, full surface phasing can be achieved by using a conventional Shack-Hartmann technique followed by finding the RMS best fit for each segment of the mirror array.

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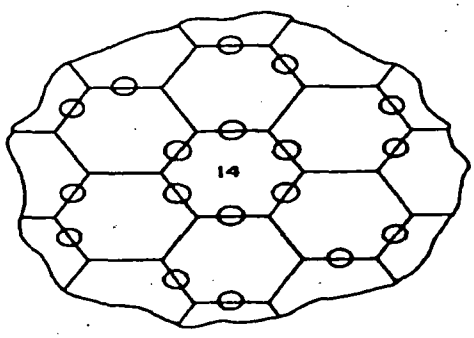

N92-29133* National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.

LASER OPTICAL DISK POSITION ENCODER WITH ACTIVE HEADS Patent

ERIC P. OSBORNE, inventor (to NASA) 21 Apr. 1992 23 p Filed 30 Mar. 1990 Supersedes N91-14001 (29 - 5, p 717)

(NASA-CASE-GSC-13175-1; US-PATENT-5,107,107; US-PATENT-APPL-SN-506636; US-PATENT-CLASS-250-231.14; US-PATENT-CLASS-369-44.26; INT-PATENT-CLASS-G01D-5/34) Avail: US Patent and Trademark Office

An angular position encoder is provided that minimizes the effects of eccentricity and other misalignments between the disk and the read stations by employing heads which incorporate beam steering optics with the ability to actively track the disk in directions along the disk radius and normal to its surface. The device adapts *features prevalent in optical disk technology toward the application* of angular position sensing. A reflective disk and the principles of interferometry are employed. The servo-controlled steering optics *move so as to acquire a track on the disk lying at a predetermined* radius and distance below the head, and then adjust position and orientation in order to maintain the view of the disk track as required. *Thus, the device is actively self-aligning.*

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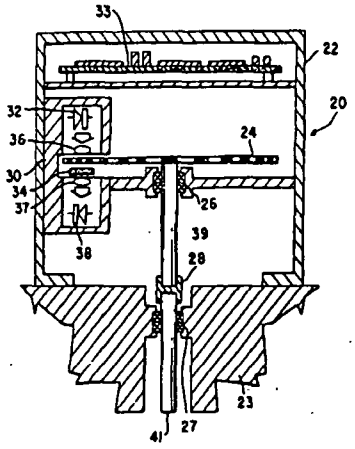


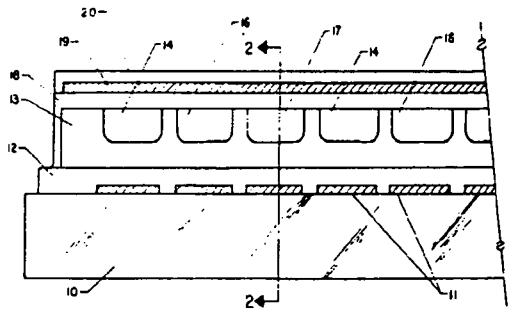
N92-29158* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

SINGLE LAYER MULTI-COLOR LUMINESCENT DISPLAY AND METHOD OF MAKING Patent

JAMES B. ROBERTSON, inventor (to NASA) 14 Apr. 1992 8 p Filed 30 Apr. 1991 Continuation-in-part of abandoned US-Patent-Appl-SN-337768, filed 13 Apr. 1989 which is a division of US-Patent-Appl-SN-140185, filed 31 Dec. 1987

(NASA-CASE-LAR-13616-3; US-PATENT-5,104,683; US-PATENT-APPL-SN-693049; US-PATENT-APPL-SN-337768; US-PATENT-APPL-SN-140185; US-PATENT-CLASS-427-38; US-PATENT-CLASS-427-66; US-PATENT-CLASS-427-68; US-PATENT-CLASS-427-108; US-PATENT-CLASS-427-109) Avail: US Patent and Trademark Office

The invention is a multi-color luminescent display comprising an insulator substrate and a single layer of host material, which may be a phosphor deposited thereon that hosts one or more different impurities, therein forming a pattern of selected and distinctly colored phosphors such as blue, green, and red phosphors in a single layer of host material. Transparent electrical conductor means may be provided for subjecting selected portions of the pattern of colored phosphors to an electric field, thereby forming a multi-color, single layer electroluminescent display. A method of forming a multi-color luminescent display includes the steps of depositing on an insulator substrate a single layer of host material, which itself may be a phosphor, with the properties to host varying quantities of different impurities and introducing one or more of said different impurities into selected areas of the said single layer of host material by thermal diffusion or ion implantation to form a pattern of phosphors of different colors in the said single layer of host material. Official Gazette of the U.S. Patent and Trademark Office



N92-29832*# National Aeronautics and Space Administration. Pasadena Office, CA.

IMPROVED REAL-TIME IMAGING SPECTROMETER Patent Application

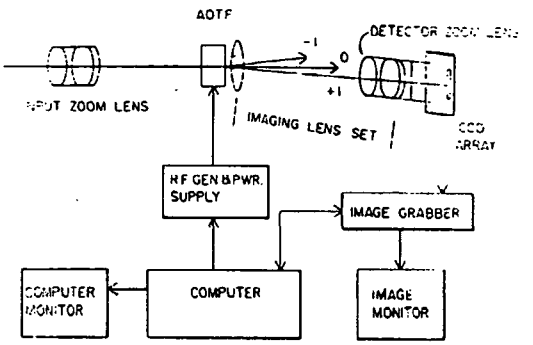
JAMES L. LAMBERT, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.), TIEN-HSIN CHAO, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.), JEFFREY W. YU, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.), and LI-JEN CHENG, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 9 Dec. 1991 39 p

(Contract NAS7-918)

(NASA-CASE-NPO-18410-1-CU; NAS 1.71:NPO-18410-1-CU; US-PATENT-APPL-SN-805341) Avail: CASI HC A03/MF A01

An improved AOTF-based imaging spectrometer that 33 74 OPTICS offers several advantages over prior art AOTF imaging spectrometers is presented. The ability to electronically set the bandpass wavelength provides observational flexibility. Various improvements in optical architecture provide simplified magnification variability, improved image resolution and light throughput efficiency and reduced sensitivity to ambient light. Two embodiments of the invention are: (1) operation in the visible/near-infrared domain of wavelength range 0.48 to 0.76 microns; and (2) infrared configuration which operates in the wavelength range of 1.2 to 2.5 microns.

NASA



N92-29951*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

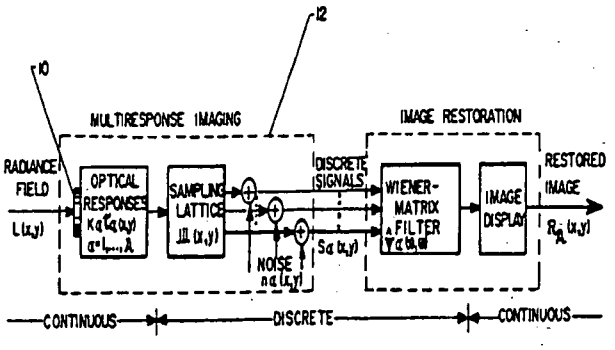
MULTIRESPONSE IMAGER AND IMAGING PROCESS FOR IMPROVED RESOLUTION Patent Application

CARL E. FALES, inventor (to NASA) and FREDRICH O. HUCK, inventor (to NASA) 14 May 1992 16 p

(NASA-CASE-LAR-14779-1; NAS 1.71:LAR-14779-1; US-PATENT-APPL-SN-885714) Avail: CASI HC A03/MF A01

The implementation of this invention consists of two elements, the image gathering device and an image restoration filter algorithm. The image gathering device is implemented with an optical aperture control that allows one to change the spatial frequency response of the image gathering device for each one of the successive image acquisitions; the image restoration algorithm unscrambles the within-passband and aliased signal components in the presence of photosensor noise to produce an image with an increased resolution. The upper limit of the increase in resolution is 1/square root of A times the sampling interval of the image gathering device for A image gathering events. The image gathering device and the target must be stationary with respect to each other during the image gathering process.

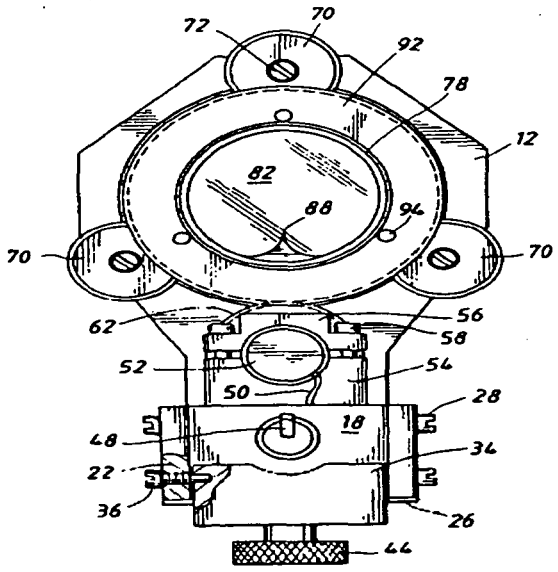
NASA



N92-30027*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
POLARIZATION PERCEPTION DEVICE Patent Application
VICTOR S. WHITEHEAD, inventor (to NASA) and KINSEL L. COULSON, inventor (to NASA) (California Univ., Davis.) 6 Apr. 1992 20 p
(NASA-CASE-MSC-21915-1; NAS 1.71:MSC-21915-1; US-PATENT-APPL-SN-863883) Avail: CASI HC A03/MF A01

A polarization perception device comprises a base and a polarizing filter having opposite broad sides and a centerline perpendicular thereto. The filter is mounted on the base for relative rotation and with a major portion of the area of the filter substantially unobstructed on either side. A motor on the base automatically moves the filter angularly about its centerline at a speed slow enough to permit changes in light transmission by virtue of such movement to be perceived as light-dark pulses by a human observer, but fast enough so that the light phase of each such pulse occurs prior to fading of the light phase image of the preceding pulse from the observer's retina. In addition to an observer viewing a scene in real time through the filter while it is so angularly moved, or instead of such observation, the scene can be photographed, filmed or taped by a camera whose lens is positioned behind the filter.

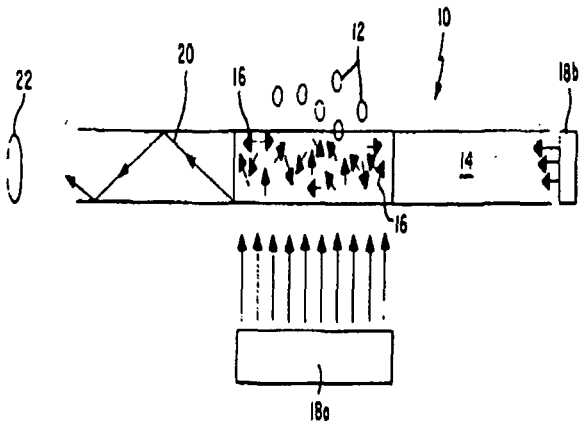
NASA



N92-30029*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
OPTICAL FIBER SENSOR HAVING AN ACTIVE CORE Patent Application
CLAUDIO OLIVEIRA EGALON, inventor (to NASA) (Analytical Services and Materials, Inc., Hampton, VA.) and ROBERT S. ROGOWSKI, inventor (to NASA) 18 Mar. 1992 17 p
(NASA-CASE-LAR-14607-1SB; NAS 1.71:LAR-14607-1SB; US-PATENT-APPL-SN-855363) Avail: CASI HC A03/MF A01

An optical fiber is provided comprising an active fiber core which produces waves of light upon excitation. A factor ka is identified and increased until a desired improvement in power efficiency is obtained. The variable a is the radius of the active fiber core and k is defined as 2 pi/lambda wherein lambda is the wavelength of the light produced by the active fiber core. In one embodiment, the factor ka is increased until the power efficiency stabilizes. In addition to a bare fiber core embodiment, a two-stage fluorescent fiber is provided wherein an active cladding surrounds a portion of the active fiber core having an improved ka factor. The power efficiency of the embodiment is further improved by increasing a difference between the respective indices of refraction of the active cladding and the active fiber core.

NASA

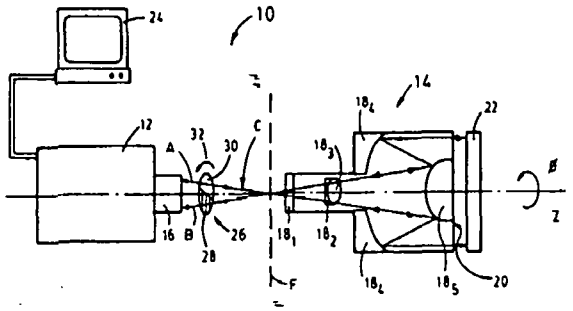


N92-30084*# National Aeronautics and Space Administration. Pasadena Office, CA.
DYNAMIC APERTURE FRINGE DISCRIMINATOR Patent Application
LAWRENCE J. STEIMLE, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) and DAVID L. THIESSEN, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 15 May 1992 27 p
(Contract NAS7-918)
(NASA-CASE-NPO-18478-1-CU; NAS 1.71:NPO-18478-1-CU; US-PATENT-APPL-SN-883957) Avail: CASI HC A03/MF A01

A device for eliminating unwanted reflections from refractive optical elements in an optical system is provided. The device operates to prevent desired multiple fringe patterns from being obscured by reflections from refractive elements positioned in proximity to a focal plane of the system. The problem occurs when an optical beam is projected into, and reflected back out of, the optical system. Surfaces of the refractive elements reflect portions of the beam which interfere with portions of the beam which are transmitted through the refractive elements. Interference between the reflected and transmitted portions of the beam produce multiple fringe sets which tend to obscure desired interference fringes. With the refractive optical element in close proximity to the focal plane of the system, the undesired reflected light reflects at an angle 180 degrees opposite from the desired transmitted beam. The device exploits the 180-degree offset, or rotational shear, of the undesired reflected light by providing an optical stop for blocking one-half of the cross-section of the test beam. By blocking one-half of the test beam, the undesired offset beam is blocked, while the returning transmitted beam passes into the optical system unaffected. An image is thereby produced from only the desired transmitted beam. In one configuration, the blocking device includes a semicircular aperture which is caused to rotate about the axis of the test beam. By rotating, all

portions of the test beam are cyclically projected into the optical system to thereby produce a complete test image. The rotating optical stop is preferably caused to rotate rapidly to eliminate flicker in the resulting image.

NASA



N92-30104*# National Aeronautics and Space Administration. Pasadena Office, CA.

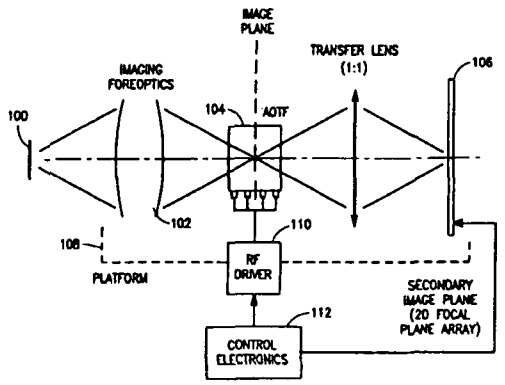
PROGRAMMABLE HYPERSPECTRAL IMAGE MAPPER WITH ON-ARRAY PROCESSING Patent Application

JAMES A. CUTTS, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 22 Jun. 1992 36 p (Contract NAS7-918)

(NASA-CASE-NPO-17794-1-CU; NAS 1.71:NPO-17794-1-CU; US-PATENT-APPL-SN-904550) Avail: CASI HC A03/MF A01

A hyperspectral imager includes a focal plane having an array of spaced image recording pixels receiving light from a scene moving relative to the focal plane in a longitudinal direction, the recording pixels being transportable at a controllable rate in the focal plane in the longitudinal direction, an electronic shutter for adjusting an exposure time of the focal plane, whereby recording pixels in an active area of the focal plane are removed therefrom and stored upon expiration of the exposure time, an electronic spectral filter for selecting a spectral band of light received by the focal plane from the scene during each exposure time and an electronic controller connected to the focal plane, to the electronic shutter and to the electronic spectral filter for controlling (1) the controllable rate at which the recording is transported in the longitudinal direction, (2) the exposure time, and (3) the spectral band so as to record a selected portion of the scene through M spectral bands with a respective exposure time t(sub q) for each respective spectral band q.

NASA



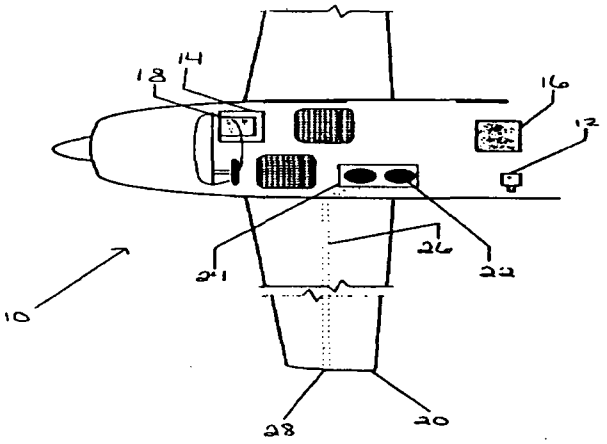
N92-30312*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

OFF-SURFACE INFRARED FLOW VISUALIZATION Patent Application

GREGORY S. MANUEL, inventor (to NASA), CLIFFORD J. OBARA, inventor (to NASA) (Lockheed Engineering and Sciences Co., Hampton, VA.), KAMRAN DARYABEIGI, inventor (to NASA), and DAVID W. ALDERFER, inventor (to NASA) 16 Dec. 1991 8 p (NASA-CASE-LAR-14568-1; NAS 1.71:LAR-14568-1; US-PATENT-APPL-SN-808302) Avail: CASI HC A02/MF A01

A method for visualizing off-surface flows is provided which consists of releasing a gas with infrared absorbing and emitting characteristics into a fluid flow and imaging the flow with an infrared imaging system. This method allows for visualization of off-surface fluid flow in-flight. The novelty of this method is found in providing an apparatus for flow visualization which is contained within the aircraft so as not to disrupt the airflow around the aircraft, is effective at various speeds and altitudes, and is longer-lasting than previous methods of flow visualization.

NASA



N92-33017* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

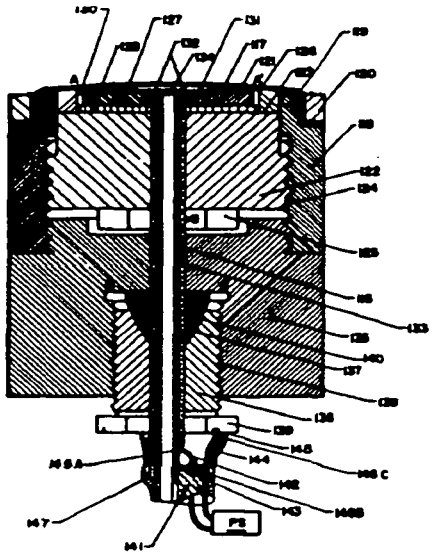
HIGH TEMPERATURE FIBER OPTIC MICROPHONE HAVING A PRESSURE-SENSING REFLECTIVE MEMBRANE UNDER TENSILE STRESS Patent

ALLAN J. ZUCKERWAR, inventor (to NASA), FRANK W. CUOMO, inventor (to NASA), WILLIAM E. ROBBINS, inventor (to NASA), and PURNELL HOPSON, JR., inventor (to NASA) 8 Sep. 1992 16 p Filed 21 Sep. 1990 Supersedes N91-15874 (29 - 7, p 1068) (NASA-CASE-LAR-14402-1-CU; US-PATENT-5,146,083; US-PATENT-APPL-SN-586369; US-PATENT-CLASS-250-227.21; US-PATENT-CLASS-250-231.19; US-PATENT-CLASS-73-705; US-PATENT-CLASS-358-12; INT-PATENT-CLASS-H01J-40/14) Avail: US Patent and Trademark Office

A fiber optic microphone is provided for measuring fluctuating pressures. An optical fiber probe having at least one transmitting fiber for transmitting light to a pressure-sensing membrane and at least one receiving fiber for receiving light reflected from a stretched membrane is provided. The pressure-sensing membrane may be stretched for high frequency response. Further, a reflecting surface of the pressure-sensing membrane may have dimensions which substantially correspond to dimensions of a cross section of the optical fiber probe. Further, the fiber optic microphone can be made

of materials for use in high temperature environments, for example greater than 1000 F. A fiber optic probe is also provided with a backplate for damping membrane motion. The backplate further provides a means for on-line calibration of the microphone.

Official Gazette of the U.S. Patent and Trademark Office



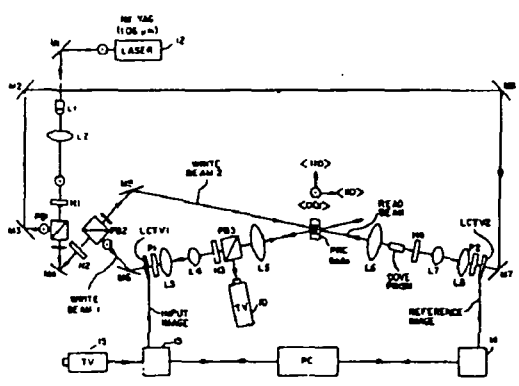
N92-33022* National Aeronautics and Space Administration. Pasadena Office, CA.

REAL-TIME EDGE-ENHANCED OPTICAL CORRELATOR Patent

TSUEN-HSI LIU, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) and LI-JEN CHENG, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 22 Sep. 1992 9 p Filed 25 Nov. 1991 Supersedes N92-17675 (30 - 8, p 1367) (NASA-CASE-NPO-18379-1-CU; US-PATENT-5,150,228; US-PATENT-APPL-SN-797569; US-PATENT-CLASS-359-7; US-PATENT-CLASS-359-559; US-PATENT-CLASS-359-561; INT-PATENT-CLASS-G03B-1/16; INT-PATENT-CLASS-G02B-27/42) Avail: US Patent and Trademark Office

Edge enhancement of an input image by four-wave mixing a first write beam with a second write beam in a photorefractive crystal, GaAs, was achieved for VanderLugt optical correlation with an edge enhanced reference image by optimizing the power ratio of a second write beam to the first write beam (70:1) and optimizing the power ratio of a read beam, which carries the reference image to the first write beam (100:701). Liquid crystal TV panels are employed as spatial light modulators to change the input and reference images in real time.

Official Gazette of the U.S. Patent and Trademark Office



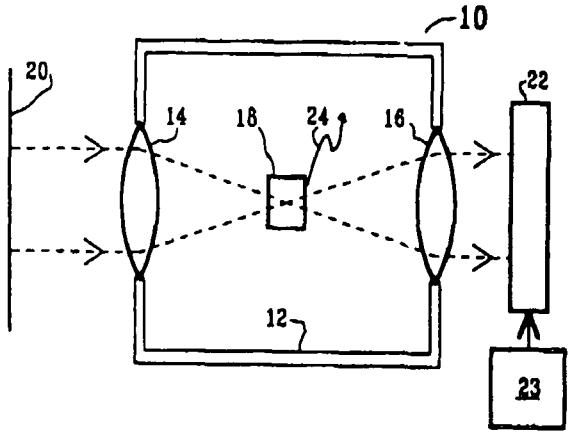
N92-33028* National Aeronautics and Space Administration. Pasadena Office, CA.

REAL TIME PRE-DETECTION DYNAMIC RANGE COMPRESSION Patent

HUA-KUANG LIU, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 14 Jul. 1992 5 p Filed 19 Dec. 1990 Supersedes N91-23890 (29 - 15, p 2507) (NASA-CASE-NPO-18098-1-CU; US-PATENT-5,130,530; US-PATENT-APPL-SN-633746; US-PATENT-CLASS-250-216; US-PATENT-CLASS-359-241; INT-PATENT-CLASS-H01J-3/14) Avail: US Patent and Trademark Office

A real time, pre-detection optical dynamic range compression system uses a photorefractive crystal, such as BaTiO3 or LiNbO3, in which light induced scattering from crystal inhomogeneities of the optical input occurs as a nonlinear function of the input intensity. The greater the intensity, the faster random interference gratings are created to scatter the incident light. The unscattered portion of the optical signal is therefore reduced in dynamic range over time. The amount or range of dynamic range compression may be controlled by adjusting the time of application of the unscattered crystal output to the photodetector with regard to the time of application of the optical input to the crystal.

Official Gazette of the U.S. Patent and Trademark Office



N92-34241*# National Aeronautics and Space Administration. Pasadena Office, CA.

ALKALI METAL FOR ULTRAVIOLET BAND-PASS FILTER Patent Application

NICK MARDESICH, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.), GEORGE A. FRASCHETTI, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.), TIMOTHY MCCANN, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.), SHERWOOD D. MAYALL, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.), DONALD E. DUNN, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.), and JOHN T. TRAUGER, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 27 Aug. 1992 13 p

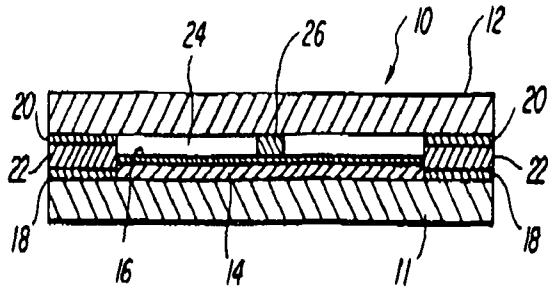
(Contract NAS7-918)

(NASA-CASE-NPO-18433-1-CU; NAS 1.71:NPO-18433-1-CU; US-PATENT-APPL-SN-936417) Avail: CASI HC A03/MF A01

An alkali metal filter having a layer of metallic bismuth deposited onto the alkali metal is provided. The metallic bismuth acts to stabilize the surface of the alkali metal to prevent substantial surface migration from occurring on the alkali metal, which may degrade optical charac-

teristics of the filter. To this end, a layer of metallic bismuth is deposited by vapor deposition over the alkali metal to a depth of approximately 5 to 10 A. A complete alkali metal filter is described along with a method for fabricating the alkali metal filter.

NASA



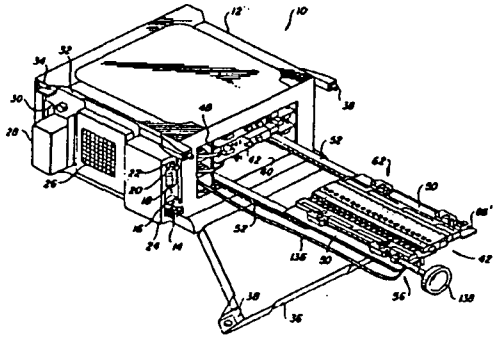
76
SOLID-STATE PHYSICS

Includes superconductivity.

N92-25398* National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.
MACROMOLECULAR CRYSTAL GROWING SYSTEM Patent
ROBERT S. SNYDER, inventor (to NASA), BLAIR J. HERREN, inventor (to NASA), DANIEL C. CARTER, inventor (to NASA), VAUGHN H. YOST, inventor (to NASA), CHARLES E. BUGG, inventor (to NASA), LAWRENCE J. DELUCAS, inventor (to NASA), and FRED L. SUDDATH, inventor (to NASA) 7 May 1991 15 p Filed 31 Aug. 1990
(NASA-CASE-MFS-26088-1-CU; US-PATENT-5,013,531; US-PATENT-APPL-SN-575736; US-PATENT-CLASS-422-245; US-PATENT-CLASS-422-247; US-PATENT-CLASS-156-DIG.62; US-PATENT-CLASS-156-DIG.113; INT-PATENT-CLASS-B01D-9/00) Avail: US Patent and Trademark Office

A macromolecular crystal growing system especially designed for growing crystals in the low gravity of space as well as the gravity of earth includes at least one tray assembly, a carrier assembly which receives the tray, and a refrigeration-incubation module in which the carrier assembly is received. The tray assembly includes a plurality of sealed chambers with a plastic syringe and a plug means for the double tip of the syringe provided therein. Ganging mechanisms operate the syringes and plugs simultaneously in a precise and smooth operation. Preferably, the tray assemblies are mounted on ball bearing slides for smooth operation in inserting and removing the tray assemblies into the carrier assembly. The plugging mechanism also includes a loading control mechanism. A mechanism for leaving a syringe unplugged is also provided.

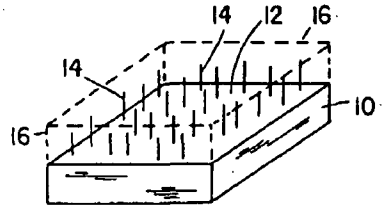
Official Gazette of the U.S. Patent and Trademark Office



N92-30102*# National Aeronautics and Space Administration. Pasadena Office, CA.
METHOD OF FORMING SILICON STRUCTURES WITH SELECTABLE OPTICAL CHARACTERISTICS Patent Application
ROBERT W. FATHAUER, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 10 Jul. 1992 14 p (Contract NAS7-918)
(NASA-CASE-NPO-18625-1-CU; NAS 1.71:NPO-18625-1-CU; US-PATENT-APPL-SN-912981) Avail: CASI HC A03/MF A01

Silicon and metal are coevaporated onto a silicon substrate in a molecular beam epitaxy system with a larger than stoichiometric amount of silicon so as to epitaxially grow particles of metal silicide embedded in a matrix of single crystal epitaxially grown silicon. The particles interact with incident photons by resonant optical absorption at the surface plasmon resonance frequency. Controlling the substrate temperature and deposition rate and time allows the aspect ratio of the particles to be tailored to desired wavelength photons and polarizations. The plasmon energy may decay as excited charge carriers or phonons, either of which can be monitored to indicate the amount of incident radiation at the selected frequency and polarization.

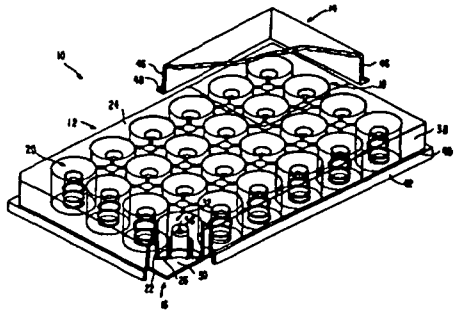
NASA



N92-34171* National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.
PROTEIN CRYSTAL GROWTH TRAY ASSEMBLY Patent
DANIEL C. CARTER, inventor (to NASA) and TERESA Y. MILLER, inventor (to NASA) 14 Jul. 1992 6 p Filed 23 Oct. 1990 Supersedes N91-23933 (29 - 15, p 2514)
(NASA-CASE-MFS-28507-1; US-PATENT-5,130,105; US-PATENT-APPL-SN-601954; US-PATENT-CLASS-422-245; US-PATENT-CLASS-422-254; US-PATENT-CLASS-422-56; US-PATENT-CLASS-422-99; US-PATENT-CLASS-422-102; US-PATENT-CLASS-156-600; US-PATENT-CLASS-156-621) Avail: US Patent and Trademark Office

A protein crystal growth tray assembly includes a tray that has a plurality of individual crystal growth chambers. Each chamber has a movable pedestal which carries a protein crystal growth compartment at an upper end. The several pedestals for each tray assembly are ganged together for concurrent movement so that the solutions in the various pedestal growth compartments can be separated from the solutions in the tray's growth chambers until the experiment is to be activated.

Official Gazette of the U.S. Patent and Trademark Office

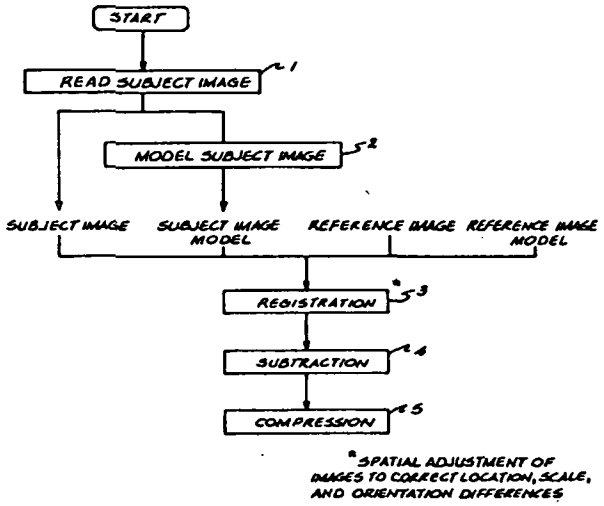


82
DOCUMENTATION AND INFORMATION SCIENCE

Includes information management; information storage and retrieval technology; technical writing; graphic arts; and micrography.

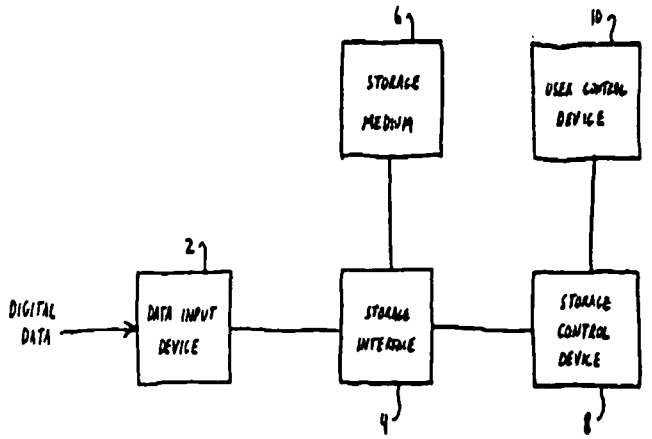
N92-23550*# National Aeronautics and Space Administration. John C. Stennis Space Center, Bay Saint Louis, MS.
DIGITAL DATA REGISTRATION AND DIFFERENCING COMPRESSION SYSTEM Patent Application
GARY A. RANSFORD, inventor (to NASA) (Sverdrup Technology, Inc., Brook Park, OH.) and VIVIEN J. CAMBRIDGE, inventor (to NASA) (Sverdrup Technology, Inc., Bay Saint Louis, MS.) 28 Feb. 1992 46 p
(NASA-CASE-SSC-00010-2; NAS 1.71:SSC-00010-2; US-PATENT-APPL-SN-842956) Avail: CASI HC A03/MF A01

A process for x ray registration and differencing results in more efficient compression is discussed. Differencing of registered modeled subject image with a modeled reference image forms a differential image for compression with conventional compression algorithms. Obtention of a modeled reference image includes modeling a relatively unrelated standard reference image upon a three dimensional model, which three dimensional model is also used to model the subject image for obtaining the modeled subject image. The registration process of the modeled subject image and modeled reference image translationally correlates such modeled images for resulting correlation thereof in spatial and spectral dimensions. Prior to compression, a portion of the image falling outside a designated area of interest may be eliminated, for subsequent replenishment with a standard reference image. The compressed differenced image may be subsequently transmitted and/or stored, for subsequent decompression and addition to a standard reference image so as to form a reconstituted or approximated subject image at either remote location and/or at a later moment in time. Overall effective compression ratios of 100:1 are possible for thoracic x ray digital images.
NASA



N92-30386*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
STORAGE CONTROL SYSTEM Patent Application
KENNETH D. WRIGHT, II, inventor (to NASA) and DAVID L. GRAY, inventor (to NASA) 27 Nov. 1991 108 p
(NASA-CASE-LAR-14651-1; NAS 1.71:LAR-14651-1; US-PATENT-APPL-SN-799571) Avail: CASI HC A06/MF A02

A storage control system is presented which includes an apparatus and method for user control of a storage interface to operate a storage medium to store data obtained by a real-time data acquisition system. Digital data received in serial format from the data acquisition system is first converted to a parallel format and then provided to the storage interface. The operation of the storage interface is controlled in accordance with instructions based on user control input from a user. Also, a user status output is displayed in accordance with storage data obtained from the storage interface. By allowing the user to control and monitor the operation of the storage interface, a stand-alone, user-controllable data storage system is provided for storing the digital data obtained by a real-time data acquisition system.
NASA



89
ASTRONOMY

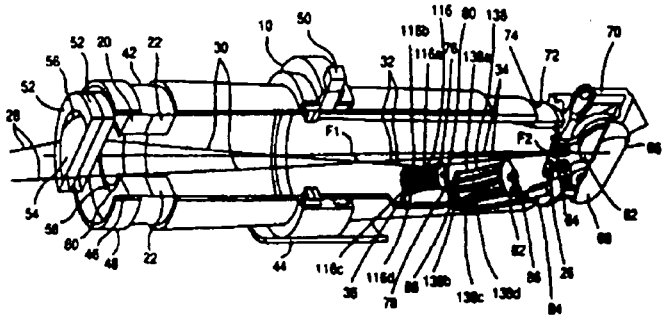
Includes radio, gamma-ray, and infrared astronomy; and astrometry.

N92-33012*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.
MULTISPECTRAL VARIABLE MAGNIFICATION GLANCING INCIDENCE X RAY TELESCOPE Patent
RICHARD B. HOOVER, inventor (to NASA) 8 Sep. 1992 13 p Filed 28 Jun. 1990 Supersedes N90-27595 (28-21, p 3096) Continuation-in-part of US-Patent-Appl-SN-765979, filed 15 Aug. 1989 (NASA-CASE-MFS-28013-4; US-PATENT-5,146,482; US-PATENT-APPL-SN-545008; US-PATENT-APPL-SN-765979; US-PATENT-CLASS-378-43; US-PATENT-CLASS-378-210; INT-PATENT CLASS-G21K-7/00) Avail: US Patent and Trademark Office

A multispectral, variable magnification, glancing incidence, x-ray telescope capable of broadband, high resolution imaging of solar and stellar x-ray and extreme ultraviolet radiation sources is discussed. The telescope includes a primary optical system which focuses the incoming radiation to a primary focus. Two or more rotatable mirror carriers, each providing a different magnification, are positioned behind the primary focus at an inclination to the optical axis. Each carrier has a series of ellipsoidal mirrors, and each mirror has a concave surface covered with a multilayer (layered synthetic microstructure) coating to reflect a different desired wavelength. The mirrors of both carriers are segments of ellipsoids having a common first focus coincident with the primary focus. A detector such as an x-ray sensitive photographic film is positioned at the second respective focus of each mirror so that each mirror may reflect the image at the first focus to the detector at the second focus. The carriers are

selectively rotated to position a selected mirror for receiving radiation from the primary optical system, and at least the first carrier may be withdrawn from the path of the radiation to permit a selected mirror on the second carrier to receive the radiation.

Official Gazette of the U.S. Patent and Trademark Office



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NASA *patent application specifications* are sold in paper copy and microfiche by the NASA Center for AeroSpace Information (CASI). The N accession number should be used in ordering either paper copy or microfiche from CASI.

LICENSES FOR COMMERCIAL USE: INQUIRIES AND APPLICATIONS FOR LICENSE

NASA inventions, abstracted in *NASA PAB,* are available for nonexclusive or exclusive licensing in accordance with the NASA Patent Licensing Regulations. It is significant that all licenses for NASA inventions shall be by express written instruments and that no license will be granted or implied in a NASA invention except as provided in the NASA Patent Licensing Regulations.

Inquiries concerning the NASA Patent Licensing Program or the availability of licenses for the commercial use of NASA-owned inventions covered by U.S. patents or pending applications for patent should be forwarded to the NASA Patent Counsel of the NASA installation having cognizance of the specific invention, or the Associate General Counsel for Intellectual Property, code GP, National Aeronautics and Space Administration, Washington, D.C. 20546. Inquiries should refer to the NASA Case Number, the Title of the Invention, and the U.S. Patent Number or the U.S. Application Serial Number assigned to the invention as shown in *NASA PAB.*

The NASA Patent Counsel having cognizance of the invention is determined by the first three letters or prefix of the NASA Case Number assigned to the invention. The addresses of NASA Patent Counsels are listed alongside the NASA Case Number prefix letters in the following table.

STANDING ORDER SUBSCRIPTIONS

NASA SP-7039, Section 1 and its supplements are available from the NASA Center for AeroSpace Information on standing order subscription. Standing order subscriptions do not terminate at the end of a year, as do regular subscriptions, but continue indefinitely unless specifically terminated by the subscriber.

NASA Case Number Prefix Letters	Address of Cognizant NASA Patent Counsel
ARC-xxxxx XAR-xxxxx	Ames Research Center Mail Code: 200-11A Moffett Field, California 94035 Telephone: (415) 694-5104
ERC-xxxxx XER-xxxxx HQN-xxxxx XHQ-xxxxx	NASA Headquarters Mail Code: GP Washington, DC 20546 Telephone: (202) 358-2066
GSC-xxxxx XGS-xxxxx	Goddard Space Flight Center Mail Code: 204 Greenbelt, Maryland 20771 Telephone: (301) 286-7351
KSC-xxxxx XKS-xxxxx	John F. Kennedy Space Center Mail Code: PT-PAT Kennedy Space Center, Florida 32899 Telephone: (305) 867-2544
LAR-xxxxx XLA-xxxxx	Langley Research Center Mail Code: 279 Hampton, Virginia 23365 Telephone: (804) 865-3725
LEW-xxxxx XLE-xxxxx	Lewis Research Center Mail Code: 500-318 21000 Brookpark Road Cleveland, Ohio 44135 Telephone: (216) 433-5753
MSC-xxxxx XMS-xxxxx	Lyndon B. Johnson Space Center Mail Code: AL3 Houston, Texas 77058 Telephone: (713) 483-4871
MFS-xxxxx XMF-xxxxx	George C. Marshall Space Flight Center Mail Code: CC01 Huntsville, Alabama 35812 Telephone: (205) 544-0024
NPO-xxxxx XNP-xxxxx FRC-xxxxx XFR-xxxxx WOO-xxxxx	NASA Resident Legal Office Mail Code: 180-801 4800 Oak Grove Drive Pasadena, California 91103 Telephone: (818) 354-2700

PATENT LICENSING REGULATIONS

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

14 CFR Part 1245

Licensing of NASA Inventions

AGENCY: National Aeronautics and Space Administration
ACTION: Interim regulation with comments requested.

SUMMARY: The National Aeronautics and Space Administration (NASA) is revising its patent licensing regulations to conform with Pub. L. 96-517. This interim regulation provides policies and procedures applicable to the licensing of federally owned inventions in the custody of the National Aeronautics and Space Administration, and implements Pub. L. 96-517. The object of this subpart is to use the patent system to promote the utilization of inventions arising from NASA supported research and development.

EFFECTIVE DATE: July 1, 1981. Comments must be received in writing by December 2, 1981. Unless a notice is published in the **Federal Register** after the comment period indicating changes to be made, this interim regulation shall become a final regulation.

ADDRESS: Mr. John G. Mannix, Director of Patent Licensing, GP-4, NASA, Washington, D.C. 20546

FOR FURTHER INFORMATION CONTACT:
Mr. John G. Mannix, (202) 755-3954.

SUPPLEMENTARY INFORMATION:

PART 1245—PATENTS AND OTHER INTELLECTUAL PROPERTY RIGHTS

Subpart 2 of Part 1245 is revised to read as follows:

* * * * *

Subpart 2—Licensing of NASA Inventions

Sec.

Restrictions and Conditions

Types of Licenses

Procedures

Authority: 35 U.S.C. Section 207 and 208.94 Stat 3023 and 3024.

* * * * *

Subpart 2—Licensing of NASA Inventions

§ 1245.200 Scope of subpart.

This subpart prescribes the terms, conditions and procedures upon which a NASA invention may be licensed. It does not affect licenses which (a) were in effect prior to July 1, 1981; (b) may exist at the time of the Government's acquisition of title to the invention, including those resulting from the allocation of rights to inventions made under Government research and development contracts; (c) are the result of an authorized exchange of rights in the settlement of patent disputes; or (d) are otherwise authorized by law or treaty.

§ 1245.201 Policy and objective.

It is the policy and objective of this subpart to use the patent system to promote the utilization of inventions arising from NASA supported research and development.

§ 1245.202 Definitions

(a) "Federally owned invention" means an invention, plant, or design which is covered by a patent, or patent application in the United States, or a patent, patent application, plant variety protection, or other form of protection, in a foreign country, title to which has been assigned to or otherwise vested in the United States Government.

(b) "Federal agency" means an executive department, military department, Government corporation, or independent establishment, except the Tennessee Valley Authority, which has custody of a Federally owned invention.

(c) "NASA Invention" means a Federally owned invention with respect to which NASA maintains custody and administration, in whole or in part, of the right, title or interest in such invention on behalf of the United States Government.

(d) "Small business firm" means a small business concern as defined at section 2 of Pub. L. 85-536 (15 U.S.C. 632) and implementing regulations of the Administrator of the Small Business Administration. For the purpose of these regulations, the size standard for small business concerns involved in Government procurement, contained in 13 CFR 121.3-8, and in subcontracting, contained in 13 CFR 121.3-12, will be used.

(e) "Practical application" means to manufacture in the case of a composition or product, to practice in the case of a process or method, or to operate in the case of a machine or system; and, in each case, under such condition, as to establish that the invention is being utilized and that its benefits are to the extent permitted by law or Government regulations available to the public on reasonable terms.

(f) "United States" means the United States of America, its territories and possessions, the District of Columbia, and the Commonwealth of Puerto Rico.

§ 1245.203 Authority to grant licenses.

NASA inventions shall be made available for licensing as deemed appropriate in the public interest. NASA may grant nonexclusive, partially exclusive, or exclusive licenses thereto under this subpart on inventions in its custody.

Restrictions and Conditions

§ 1245.204 All licenses granted under this subpart.

(a) *Restrictions.* (1) A license may be granted only if the applicant has supplied NASA with a satisfactory plan for development or marketing of the invention, or both, and with information about the applicant's capability to fulfill the plan.

(2) A license granting rights to use or sell under a NASA invention in the United States shall normally be granted only to a licensee who agrees that any products embodying the invention or produced through the use of the invention will be manufactured substantially in the United States.

(b) *Conditions.* Licenses shall contain such terms and conditions as NASA determines are appropriate for the protection of the interests of the Federal Government and the public and are not in conflict with law or this subpart. The following terms and conditions apply to any license:

(1) The duration of the license shall be for a period specified in the license agreement, unless sooner terminated in accordance with this subpart.

(2) The license may be granted for all or less than all fields of use of the invention or in specified geographical areas, or both.

(3) The license may extend to subsidiaries of the licensee or other parties if provided for in the license but shall be nonassignable without approval of NASA, except to the successor of that part of the licensee's business to which the invention pertains.

(4) The license may provide the licensee the right to grant sublicenses under the license, subject to the approval of NASA. Each sublicense shall make reference to the license, including the rights retained by the Government, and a copy of such sublicense shall be furnished to NASA.

(5) The license shall require the licensee to carry out the plan for development or marketing of the invention, or both, to bring the invention to practical application within a period specified in the license, and to continue to make the benefits of the invention reasonably accessible to the public.

(6) The license shall require the licensee to report periodically on the utilization or efforts at obtaining utilization that are being made by the licensee, with particular reference to the plan submitted.

(7) All licenses shall normally require royalties or other consideration.

(8) Where an agreement is obtained pursuant to § 1245.204(a)(2) that any products embodying the invention or produced through use of the invention will be manufactured substantially in the United States, the license shall recite such agreement.

(9) The license shall provide for the right of NASA to terminate the license, in whole or in part, if:

(i) NASA determines that the licensee is not executing the plan submitted with its request for a license and the licensee cannot otherwise demonstrate to the satisfaction of NASA that it has taken or can be expected to take within a reasonable time effective steps to achieve practical application of the invention;

(ii) NASA determines that such action is necessary to meet requirements for public use specified by Federal regulations issued after the date of the license and such requirements are not reasonably satisfied by the licensee;

(iii) The licensee has willfully made a false statement of or willfully omitted a material fact in the license application or in any report required by the license agreement; or

(iv) The licensee commits a substantial breach of a covenant or agreement contained in the license.

(10) The license may be modified or terminated, consistent with this subpart, upon mutual agreement of NASA and the licensee.

(11) Nothing relating to the grant of a license, nor the grant itself, shall be construed to confer upon any person any immunity from or defenses under the antitrust laws or from a charge of patent misuse, and the acquisition and use of rights pursuant to this subpart shall not be immunized from the operation of state or Federal law by reason of the source of the grant.

Types of Licenses

§ 1245.205 Nonexclusive licenses.

(a) *Availability of licenses.* Nonexclusive licenses may be granted under NASA inventions without publication of availability or notice of a prospective license.

(b) *Conditions.* In addition to the provisions of § 1245.204, the nonexclusive license may also provide that, after termination of a period specified in the license agreement, NASA may restrict the license to the fields of use or geographic areas, or both, in which the licensee has brought the invention to practical application and continues to make the benefits of the invention reasonably accessible to the public. However, such restriction shall be made only in order to grant an exclusive or partially exclusive license in accordance with this subpart.

§ 1245.206 Exclusive and partially exclusive licenses.

(a) Domestic licenses.

(1) *Availability of licenses.* Exclusive or partially exclusive licenses may be granted on NASA inventions: (i) 3 months after notice of the invention's availability has been announced in the **Federal Register;** or (ii) without such notice where NASA determines that expeditious granting of such a license will best serve the interests of the Federal Government and the public; and (iii) in either situation, specified in (a)(1)(i) or (ii) of this section only if:

(A) Notice of a prospective license, identifying the invention and the prospective licensee, has been published in the **Federal Register,** providing opportunity for filing written objections within a 60-day period;

(B) After expiration of the period in § 1245.206(a)(1)(iii)(A) and consideration of nay written objections received during the period, NASA has determined that:

(*1*) The interests of the Federal Government and the public will best be served by the proposed license, in view of the applicant's intentions, plans, and ability to bring the invention to practical application or otherwise promote the invention's utilizaiton by the public;

(*2*) The desired practical application has not been achieved, or is not likely expeditiously to be achieved, under any nonexclusive license which has been granted, or which may be granted, on the invention;

(*3*) Exclusive or partially exclusive licensing is a reasonable and necessary incentive to call forth the investment of risk capital and expenditures to bring the invention to practical application or otherwise promote the invention's utilization by the public; and

(*4*) The proposed terms and scope of exclusivity are not greater than reasonably necessary to provide the incentive for bringing the invention to practical application or otherwise promote the invention's utilization by the public;

(C) NASA has not determined that the grant of such license will tend substantially to lessen competition or result in undue concentration in any section of the country in any line of commerce to which the technology to be licensed relates, or to create or maintain other situations inconsistent with the antitrust laws; and

(D) NASA has given first preference to any small business firms submitting plans that are determined by the agency to be within the capabilities of the firms and as equally likely, if executed, to bring the invention to practical application as any plans submitted by applicants that are not small business firms.

(2) *Conditions.* In addition to the provisions of § 1245.204, the following terms and conditions apply to domestic exclusive and partially exclusive licenses:

(i) The license shall be subject to the irrevocable, royalty-free right of the Government of the United States to practice and have practiced the invention on behalf of the United States and on behalf of any foreign government or international organization pursuant to any existing or future treaty or agreement with the United States.

(ii) The license shall reserve to NASA the right to require the licensee to grant sublicenses to responsible applicants, on reasonable terms, when necessary to fulfill health or safety needs.

(iii) The license shall be subject to any licenses in force at the time of the grant of the exclusive or partially exclusive license.

(iv) The license may grant the licensee the right of enforcement of the licensed patent pursuant to the provisions of Chapter 29 of Title 35, United States Code, or other statutes, as determined appropriate in the public interest.

(b) Foreign licenses.

(1) *Availability of licenses.* Exclusive or partially exclusive licenses may be granted on a NASA invention covered by a foreign patent, patent application, or other form of protection, provided that:

(i) Notice of a prospective license, identifying the invention and prospective licensee, has been published in the **Federal Register,** providing opportunity for filing written objections within a 60-day period and following consideration of such objections;

(ii) NASA has considered whether the interests of the Federal Government or United States industry in foreign commerce will be enhanced; and

(iii) NASA has not determined that the grant of such license will tend substantially to lessen competition or result in undue concentration in any section of the United States in any line of commerce to which the technology to be licensed relates, or to create or maintain other situations inconsistent with antitrust laws.

(2) *Conditions.* In addition to the provisions of § 1245.204, the following terms and conditions apply to foreign exclusive and partially exclusive licenses:

(i) The license shall be subject to the irrevocable, royalty-free right of the Government of the United States to practice and have practiced the invention on behalf of the United States and on behalf of any foreign government or international organization pursuant to any existing or future treaty or agreement with the United States.

(ii) The license shall be subject to any licenses in force at the time of the grant of the exclusive or partially exclusive license.

(iii) The license may grant the licensee the right to take any suitable and necessary actions to protect the licensed property, on behalf of the Federal Government.

(c) *Record of determinations.* NASA shall maintain a record of determinations to grant exclusive or partially exclusive licenses.

Procedures

§ 1245.207 Application for a license.

An application for a license should be addressed to the Patent Counsel at the NASA installation having responsibility for the invention and shall normally include:

(a) Identification of the invention for which the license is desired, including the patent application serial number or patent number, title, and date, if known;

(b) Identification of the type of license for which the application is submitted;

(c) Name and address of the person, company, or organization applying for the license and the citizenship or place of incorporation of the applicant;

(d) Name, address, and telephone number of representative of applicant to whom correspondence should be sent;

(e) Nature and type of applicant's business, identifying products or services which the applicant has successfully commercialized, and approximate number of applicant's employees;

(f) Source of information concerning the availability of a license on the invention;

(g) A statement indicating whether applicant is a small business firm as defined in § 1245.202(c);

(h) A detailed description of applicant's plan for development or marketing of the invention, or both, which should include:

(1) A statement of the time, nature and amount of anticipated investment of capital and other resources which applicant believes will be required to bring the invention to practical application;

(2) A statement as to applicant's capability and intention to fulfill the plan, including information regarding manufacturing, marketing, financial, and technical resources;

(3) A statement of the fields of use for which applicant intends to practice the invention; and

(4) A statement of the geographic areas in which applicant intends to manufacture any products embodying the invention and geographic areas where applicant intends to use or sell the invention, or both;

(i) Identification of licenses previously granted to applicant under Federally owned inventions;

(j) A statement containing applicant's best knowledge of the extent to which the invention is being practiced by private industry or Government, or both, or is otherwise available commercially; and

(k) Any other information which applicant believes will support a determination to grant the license to applicant.

§ 1245.208 Processing applications.

(a) Applications for licenses will be initially reviewed by the Patent Counsel of the NASA installation having responsibility for the invention. The Patent Counsel shall make a preliminary recommendation to the Director of Licensing, NASA Headquarters, whether to: (1) grant the license as requested, (2) grant the license with modification after negotiation with the licensee, or (3) deny the license. The Director of Licensing shall review the preliminary recommendation of the Patent Counsel and make a final recommendation to the NASA Assistant General Counsel for Patent Matters. Such review and final recommendation may include, and be based on, any additional information obtained from applicant and other sources that the Patent Counsel and the Director of Licensing deem relevant to the license requested. The determination to grant or deny the license shall be made by the Assistant General Counsel for Patent Matters based on the final recommendation of the Director of Licensing.

(b) When notice of a prospective exclusive or partially exclusive license is published in the **Federal Register** in accordance with § 1245.206(a)(1)(iii)(A) or § 1245.206(b)(1)(i), any written objections received in response thereto will be considered by the Director of Licensing in making the final recommendation to the Assistant General Counsel for Patent Matters.

(c) If the requested license, including any negotiated modifications, is denied by the Assistant General Counsel for Patent Matters, the applicant may request reconsideration by filing a written request for reconsideration within 30 days after receiving notice of denial. This 30-day period may be extended for good cause.

(d) In addition to, or in lieu of requesting reconsideration, the applicant may also appeal the denial of the license in accordance with § 1245.211.

§ 1245.209 Notice to Attorney General.

A copy of the notice provided for in §§ 1245.206(a)(1)(iii)(A), and 1245.206(b)(1)(i) will be sent to the Attorney General.

§ 1245.210 Modification and termination of licenses.

Before modifying or terminating a license, other than by mutual agreement, NASA shall furnish the licensee and any sublicensee of record a written notice of intention to modify or terminate the license, and the licensee and any sublicensee shall be allowed 30 days after such notice to remedy any breach of the license or show cause why the license should not be modified or terminated.

§ 1245.211 Appeals.

(a) The following parties may appeal to the NASA Administrator or designee any decision or determination concerning the grant, denial, interpretation, modification, or termination of a license:

(1) A person whose application for a license has been denied;

(2) A licensee whose license has been modified or terminated, in whole or in part; or

(3) A person who timely filed a written objection in response to the notice required by §§ 1245.206(a)(1)(iii)(A) or 1245.206(b)(1)(i) and who can demonstrate to the satisfaction of NASA that such person may be damaged by the Agency action.

(b) Written notice of appeal must be filed within 30 days (or such other time as may be authorized for good cause shown) after receiving notice of the adverse decision or determination; including, an adverse decision following the request for reconsideration under § 1245.208(c). The notice of appeal, along with all supporting documentation should be addressed to the Administrator, National Aeronautics and Space Administration, Washington, DC 20546. Should the appeal raise a genuine dispute over material facts, fact-finding will be conducted by the NASA Inventions and Contributions Board. The person filing the appeal shall be afforded an opportunity to be heard and to offer evidence in support of the appeal. The Chairperson of the Inventions and Contributions Board shall prepare written findings of fact and transmit them to the Administrator or designee. The decision on the appeal shall be made by the NASA Administrator or designee. There is no further right of administrative appeal from the decision of the Administrator or designee.

§ 1245.212 Protection and administration of inventions.

NASA may take any suitable and necessary steps to protect and administer rights to NASA inventions, either directly or through contract.

§ 1245.213 Transfer of custody.

NASA having custody of certain Federally owned inventions may transfer custody and administration in whole or in part, to another Federal agency, of the right, title, or interest in any such invention.

§ 1245.214 Confidentiality of information.

Title 35, United States Code, section 209, provides that any plan submitted pursuant to § 1245.207(h) and any report required by § 1245.204(b)(6) may be treated by NASA as commercial and financial information obtained from a person and privileged and confidential and not subject to disclosure under section 552 of Title 5 of the United States Code.

James M. Beggs,

Administrator.

October 15, 1981.

[FR Doc. 81-31609 Filed 10-30-81; 8:45 am]

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	13. Type of Report and Period Covered Special Publication
12. Sponsoring Agency Name and Address National Aeronautics and Space Administration Washington, DC 20546-0001	14. Sponsoring Agency Code

15. Supplementary Notes

Section 1: Abstracts

16. Abstract

Abstracts are provided for 174 patents and patent applications entered into the NASA scientific and technical information system during the period July 1992 through December 1992. Each entry consists of a citation, an abstract, and in most cases, a key illustration selected from the patent or patent application.

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